CONFIDENTIAL

[redacted]

OPERATING INSTRUCTIONS AND MAINTENANCE GUIDE

TC-2 RECEIVER

Doc # 100-1.5-12

Cy 4

This document contains information affecting the national defense of the United States within the meaning of the Espionage Laws, Title 18 U.S.C., Section 793 and 794. Its transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law.

April 1962

JOB NO. 78-03433A

BOX NO. 11

FOLDER NO. 4

TOTAL DOCS HEREIN 1

DOC 1 REV DATE 24/11/80 BY 064540
ORIG COMP ____ OPI 56 TYPE 12
ORIG CLASS S PAGES 95 REV CLASS C
JUST 22 NEXT REV 2010 AUTH: HR 70-2

TC-2 Receiver Maintenance Guide
1962

[redacted]

CONFIDENTIAL

TABLE OF CONTENTS

Declassified in Part - Sanitized Copy Approved for Release 2012/10/16 : CIA-RDP78-03433A001100040001-6

LIST OF ILLUSTRATIONS

RECEIVER - OPERATING HANDBOOK AND MAINTENANCE GUIDE

1.0 FUNCTION

The function of the receiver is to separate the information tone pulses generated at the transmitter from the incoming voice and punch out a duplicate of the original message on teletype paper tape.

2.0 SPECIFICATIONS

2.1 Input (Telephone Line)

2.1.1 DC Resistance: Approximately 200 ohms

2.1.2 AC Impedance: 600 ohms (nominal)

2.1.3 Frequency Range: Voice; 300 to 1250 cps and 1950 to 3000 cps
Tones; 1400, 1500, 1600, 1700 and 1800 cps

2.1.4 Level: Voice; -16 to -36 dbv (long time average of rms voltage)
Tones; -43 to -63 dbv (peak rms voltage)

2.1.5 Tone Characteristics: 40 millisecond duration, isosoles triangle envelope

2.2 Output A (to telephone line)

2.2.1 DC Resistance: Same as 2.1.1

2.2.2 AC Impedance: Same as 2.1.2

2.2.3 Frequency Range: Voice; 300 to 1250 cps and 1950 to 3000 cps (No tones present)

2.2.4 Level: -6 to -26 dbv rms (long time average of rms voltage)

2.3 Output B: Punched paper tape 11/16" wide, 5 level teletype, chadded

2.4 Controls and Indicators

2.4.1 Power: OFF-ON (Toggle switch)

2.4.2 Function: Normal - Standby - Receive (rotary switch)

2.4.3 Power supply protection: Push to reset circuit breaker (fuse on power supply for 220 VAC)

2.4.4 Gain control: Operator sets gain of receiver using VU meter (2.4.5)

2.4.5 VU Meter: Indicates level of voice signal at input to receiver amplifier

2.4.6 Amber Light: Power "ON" indicator

2.5 Power Requirements

a. 90 to 126 VAC, 45 to 60 cps, 2 amperes nominal, or

b. 180 to 252 VAC, 45 to 60 cps, 1 ampere nominal

2.6 Information Rate: Determined by transmitter rate - 25 wpm nominal, 250 wpm maximum

2.7 Mechanical Characteristics

2.7.1 Dimensions: Receiver: 21-9/16" wide, 16" deep, 13" high
Perforator: 21-9/16" wide, 17-7/8" deep, 13" high

2.7.2 Weight: Receiver: 75 lbs.
Perforator: 79 lbs.

2.7.3 Finish: Hammertone gray cabinet; clear anodized front panel

2.8 Accessories

2.8.1 Power adapter (1 each)

3 prong to 2 prong power adapter

2.8.2 Card Extender (1 each)

2.8.3 Fuses

2 amp - 5 each
1/4 amp - 3 each

2.8.4 Microphone: High impedance lapel microphone

2.9 Environment

2.9.1 Temperature: 0 to +50°C

2.9.2 Humidity: 0 to 95% relative humidity

2.9.3 Shock and Vibration: Air Transportable

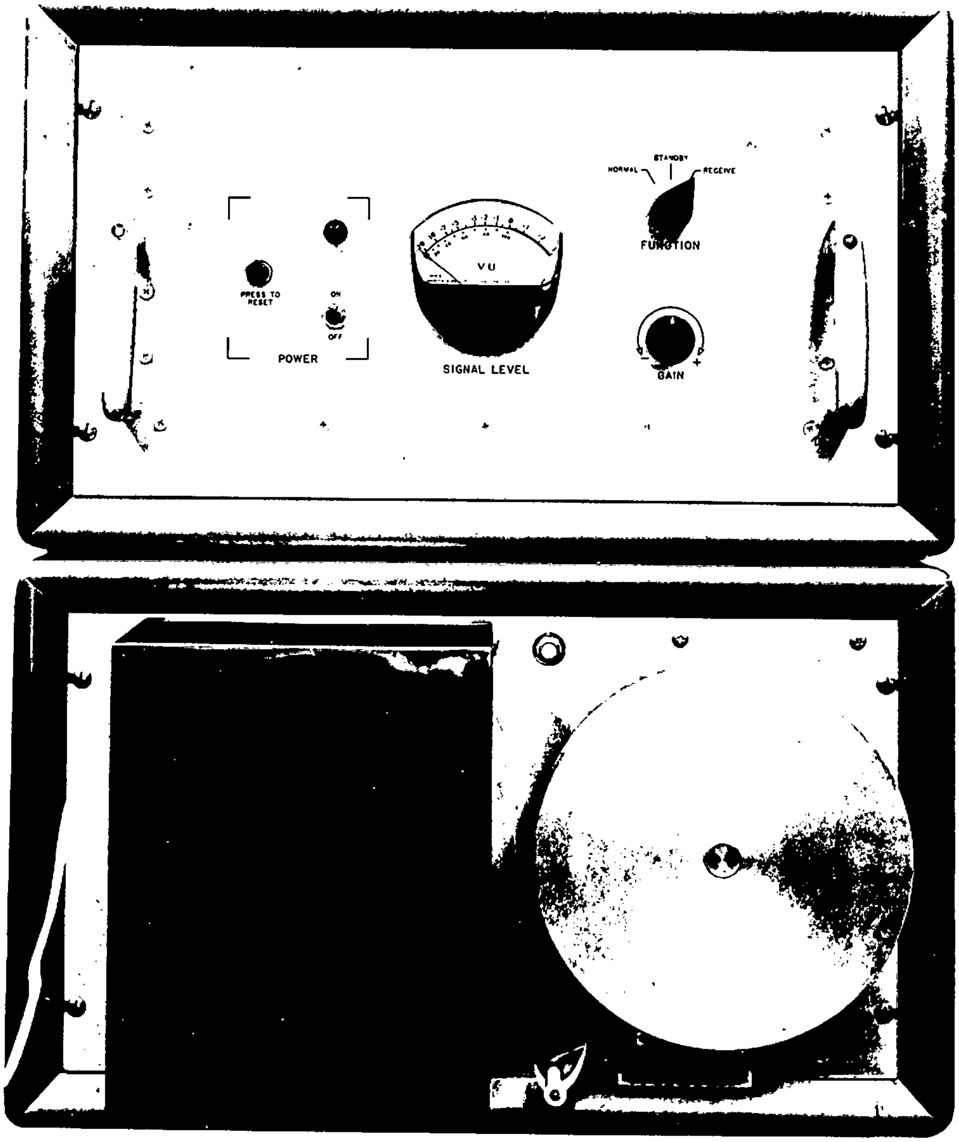


FIGURE 2.0
RECEIVER - PERFORATOR, FRONT VIEW

Declassified in Part - Sanitized Copy Approved for Release 2012/10/16 : CIA-RDP78-03433A001100040001-6

3.0 INSTALLATION

3.1 Location

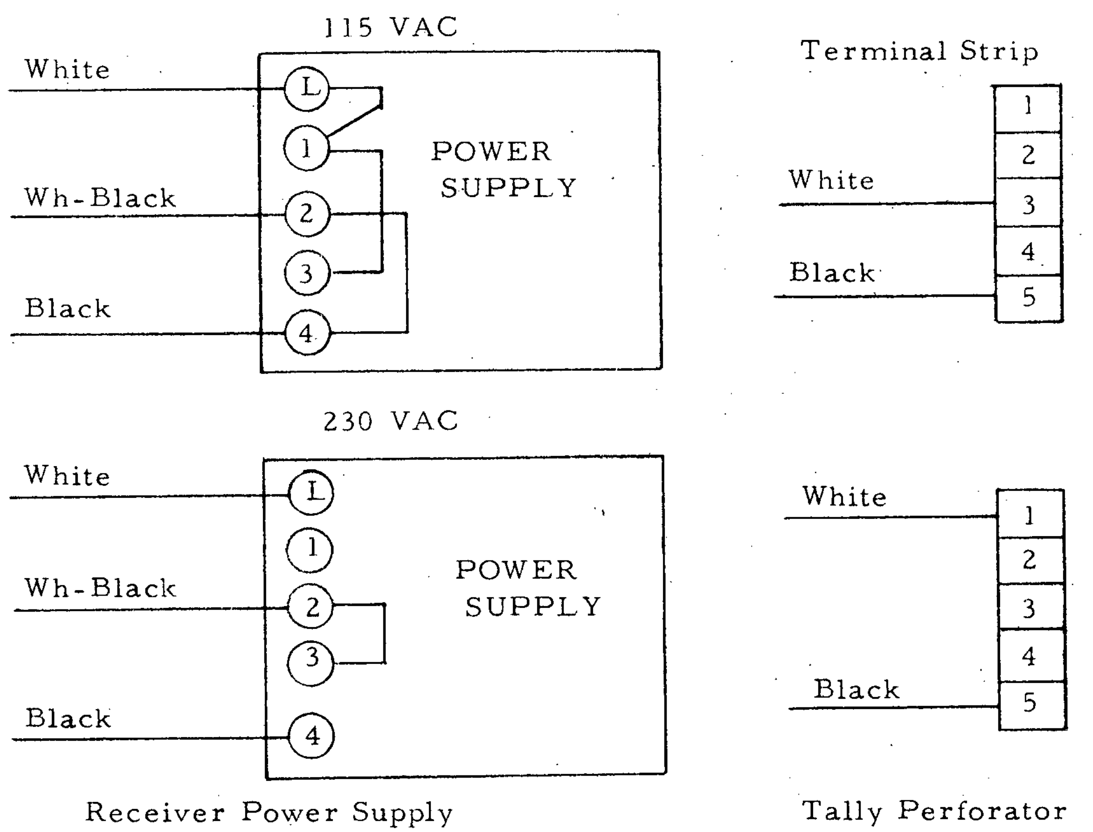
The receiver package is designed to stack on top of the perforator and the pair are then placed on a desk or table. The table should be located within about six feet of the wall telephone jack to accommodate the ten foot cable between telephone instrument and plug.

3.2 Connection to Power Line

The receiver is supplied with a three-prong non-polarized male plug for connection to the AC line. If only a two pin socket is available, the two wire adapter may be used.

CAUTION: The receiver is wired for 115 VAC operation. In order to operate on 230 VAC reconnect the power supply on the receiver chassis and the autotransformer on the perforator chassis as shown below. Also, be sure to flip the voltage plates to the 230V position.

Figure 3.2 POWER SUPPLY CONNECTIONS

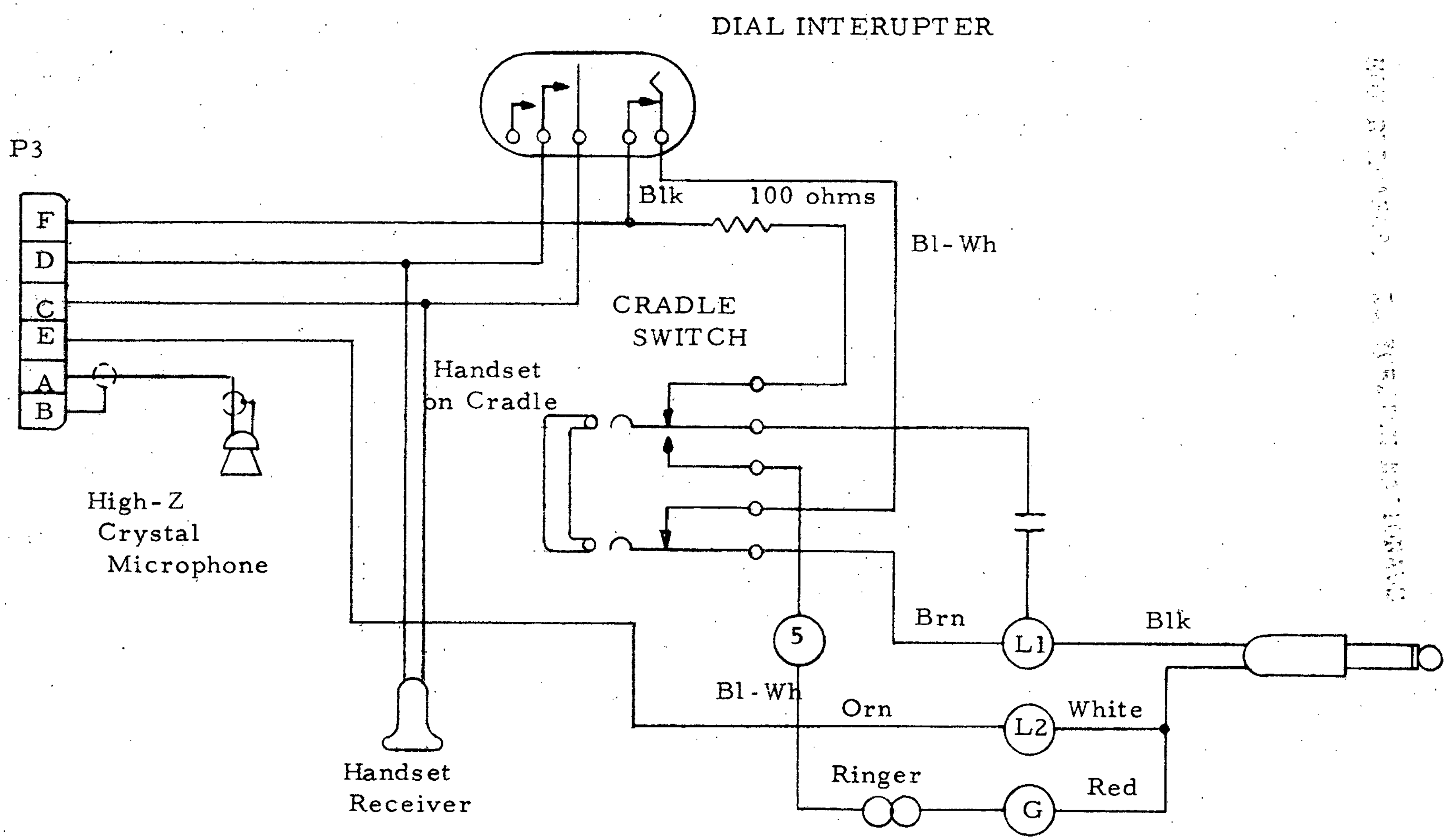


3.3 Audio Connections

The receiver audio cable consists of two wires which must be connected to a male plug of the type in use at the desired installation. This cable is brought out from the modified telephone instrument. Polarity of the connection is not important.

3.4 Telephone Instrument

The telephone instrument at the receiver location must be modified for connection to the receiver. Figure 3.4 illustrates the technique involved. Some variations must be expected for different instruments.



PARTS LIST

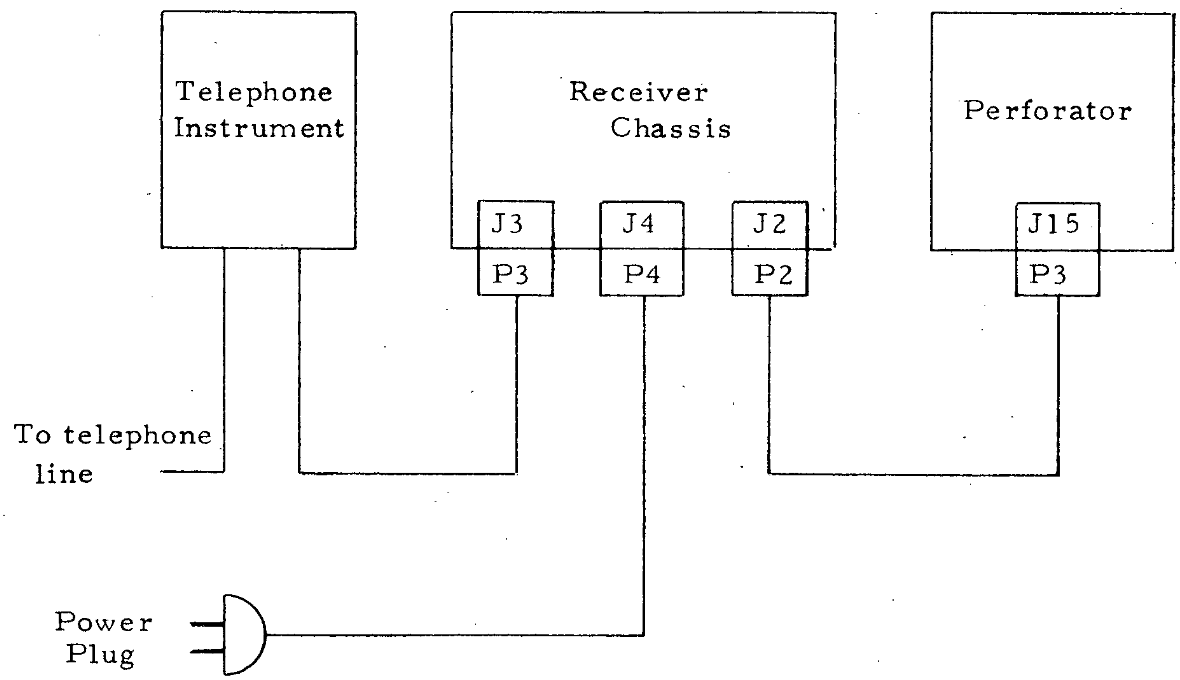
Telephone: Automatic Electri c Model N 4044 (Monophone)
Microphone: Calrad M 28 Lapel type
Terminal Strip: Jones 6 terminal barrier strip
Connector (P3): Supplied with receiver

FIGURE 3. 4 100-1 RECEIVER TELEPHONE WIRING DIAGRAM

3. 5 Interconnecting Cables

In addition to the power and audio cable, a cable is run from the telephone instrument to the receiver chassis and between the receiver and perforator chassis as shown below.

Figure 3. 5 RECEIVER INTERCONNECTION



3.6 Perforator

Before the equipment is turned on, oil must be added to the perforator punch assembly. A lubrication kit for this purpose is included with the receiver. Refer to Section 5.1 of the Tally manual for instructions.

Also, loosen the four screws holding the motor-punch assembly. This assembly should be moderately loose to avoid excessive noise but should not be allowed to touch the main front panel. The screws are made accessible by sliding back the large black cover (Figure 8.2) which is retained by permanent magnets.

4.0 OPERATING PROCEDURE

After the receiver is connected as described in 3.0 and the power switch is turned "ON", the unit is ready to receive incoming calls or may be used to initiate calls.

4.1 Receipt of a Call

Assume that a transmitting station is calling with a message to be sent. The receiver function switch should be in the Standby position and the Gain control at full CCW. The telephone will ring normally and the handset may be lifted as in a conventional installation. As the distant speaker begins to talk, immediately rotate the Gain control CW until the peaks of his voice average O VU as indicated on the meter. Then set the function switch to receive. It is necessary that the receiver be placed in the receive position and the gain control adjusted as soon as possible after establishment of the call and before the start of message transmission to avoid loss of the first part of the message. It would be desirable to have a code word or some other signaling technique to warn the receiving operator that the message transmission is imminent. Once the gain control is set, readjustment should not be necessary during that call.

The received message should be monitored to check for a sequence of "letters" symbols (mark or "hole" on all five channels) at the start. If this sequence is missing, the channel is not satisfactory for communication (too noisy or distortion too high) or else the gain control is not properly adjusted.

If it is felt that the line quality is poor, the call may be re-initiated with a good chance of obtaining a useable line.

4.2 Initiating a Call

The telephone instrument may be used to dial numbers in the usual manner. When this is done, the function switch should be in Standby to avoid tape punching on extraneous signals such as the dial tone or the unfiltered voice of someone using a conventional telephone.

5.0 MAINTENANCE

5.1 Alignment Procedure

The alignment procedure for the receiver is covered by [redacted] 25X1 Specification 100-1-10-022. This Specification together with related alignment procedures for AGC and the two-tone generator appear in the following section. Listed below are the Specifications included.

Number	Description
100-1-10-022	Receiver Test Procedure
100-1-10-017	Two-Tone Generator Alignment Specification
100-1-10-020	Receiver Keying Threshold Adjustment Specification
100-1-10-016A	Receiver Minimum Keying Threshold Adjustment Specification
100-1-10-021	Receiver Threshold Tracking Measurement

SHEET 1 OF 4 SHEETS

RECEIVER PROTOTYPE
TEST PROCEDURE PROJECT 100-1

1.0 Hybrid Adjustment

1.1 Connect 600-ohm resistor to receiver line terminals (telephone line plug)

1.2 Connect audio oscillator to Q2 base on audio card No. 1 (use card extender) and set for 1600 ± 1 cps and 1.0 vrms.

1.3 Place function switch in "Standby" position.

1.4 Set receiver gain control to maximum or to obtain useful reading on the VU meter. If sufficient deflection is not obtained, adjust R14 on audio card No. 1.

1.5 Adjust R2 (chassis) for minimum reading on the VU meter.

1.6 Remove the audio oscillator connection and place audio card No. 1 directly in its socket.

2.0 AGC Alignment

2.1 Place function switch in Receive position.

2.2 Perform test procedure 100-1-10-020 (threshold adjustment).

2.3 Perform test procedure 100-1-10-016A (minimum keying threshold)

2.4 Repeat the steps of 2.2 and tnen 2.3 which are indicated on the check lists until the threshold values are within ± 0.1 vdc of the required values (3.4 v ± 0.1 and 2.0 v ± 0.1)

2.5 Perform test procedure 100-1-10-021 (threshold tracking)

3.0 Meter Adjustment

3.1 Connect an audio oscillator to the receiver input and adjust for 20 MV p-p. Set VU meter to zero using R14 on audio card No. 1 (gain control should be at max. CW)

25X1

25X1

	Date
Prepared	
Approved	4-4-62
Approved	4-5-62

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

100-1-10-022

SECRET

3.2 Connect the transmitter output terminals to the receiver input terminals.

3.3 Key the transmitter channel 1 tone continuously (see transmitter test procedure) and adjust receiver gain control to give 6.8 volts peak-peak at TP4.

3.4 Using a voice input to the transmitter, adjust R14 on the receiver audio card No. 1 so that the average of the voice peaks is at 0 vu.

3.5 Check audibility of transmitting operator's voice at receiver telephone earpiece.

4.0 Message Transmission

4.1 Insert a standard message tape in the transmitter; connect transmitter output to attenuator and attenuator output to receiver input.

4.2 Set attenuator to 20 db.

4.3 Using a live speaker at the transmitter, send the message and check for errors in the received copy. Use at least a 3-minute speech passage for this test.

4.4 Check false alarm rate due to speaker at receiver. Use a 3-minute passage and count number of characters punched out.

4.5 Check audibility of distant speaker at receiver telephone earpiece.

25X1

25X1

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

25X1

100-1-10-022

SHEET 2 OF 4 SHEETS

REV.

TITLE

RECEIVER PROTOTYPE

TEST PROCEDURE PROJECT 100-1

Date 4-4-62

Prepared

Approved

Approved

100-1-10-022
SHEET 3 OF 4 SHEETS
REV.
TITLE
RECEIVER PROTCTYPE
TEST DATA SHEET

Date 4-4-62

Prepared
Approved
Approved

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

Project 100-1
Date ____________
Serial No. ____________
Test Operator ____________

1.0 Hybrid Adjustment

1.1 600-ohm load connected — Check ______

1.2 Audio oscillator connected and set — Check ______

1.3 Function switch to "STANDBY" — Check ______

1.4 Gain control set — Check ______

1.5 R-2 adjusted for minimum VU — Check ______

1.6 Audio card No. 1 replaced — Check ______

2.0 AGC Alignment

2.1 Function switch to "RECEIVE" — Check ______

2.2 Procedure 100-1-10-020 completed — Check ______

2.3 Procedure 100-1-10-016A completed (attach check sheet) — Check ______

2.4 Procedure 100-1-10-020 / 100-1-10-016A completed — Check ______

2.5 Procedure 100-1-10-021 completed — Check ______

25X1

	Final Threshold Data		Keying Threshold		
	2.4		2.4	2.5	2.5
Channel	Min. Threshold	Ref. Channel	6.8V ref.	12V ref.	5.0V ref.
1		5			
2		5			
3		5			
4		1			
5		1			

25X1

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

25X1

100-1-10-022

SECRET

Serial No. ____________

3.0 Meter Adjustment

3.1 R14 adjusted (coarse) Check ______

3.2 Transmitter and Receiver connected Check ______

3.3 Transmitter keyed and 6.8 volt peak-peak at TP4 Check ______

3.4 R14 adjusted (fine) Check ______

3.5 Audibility at earpiece Check ______

4.0 Message transmission

4.1 Message inserted Check ______

4.2 Atten. at 20 db Check ______

4.3 Three minute passage sent Check ______

Number of characters sent ______

Number of errors ______

4.4 Three minute passage Check ______

Number of false alarms ______

4.5 Audibility at earpiece Check ______

25X1

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

25X1

100-1-10-022 SHEET 4 OF 4 SHEETS REV.

TITLE RECEIVER PROTOTYPE TEST DATA SHEET

Date 4-4-62

Prepared

Approved

Approved

25X1

100-1-10-022

Alignment Procedure

Equipment Needed:

Two (2) HP200CD osc. or equivalent

Tektronix 531A scope

Tektronix Type "B" plug-in unit

Frequency Counter

1. Connect sync pulse jack of unit to trigger input of scope and 600-ohm load across tone generator output.
2. Connect osc. No. 1 to tone generator input No. 1.
3. Adjust osc. No. 1 for 1400 $\pm$ 1 cps and 6V peak-peak
4. Adjust output control No. 1 of two-tone generator for 0.1 V. peak-peak output
5. Remove osc. No. 1 and connect osc. No. 2 to tone generator No. 2 input.
6. Adjust osc. No. 2 for 1800 $\pm$ 1 cps and 6 V. peak-peak.
7. Adjust two-tone generator output control No. 2 for 0.1 V. peak-peak output and wave shape as in step 4.
8. Reconnect osc. No. 1 to unit.

TEST COMPLETE

25X1

	Date
Prepared	4-4-'62
Approved	4-5-62
Approved	

25X1

25X1

100-1-10-020

SHEET 1 OF 3 SHEETS

REV.

TITLE

RECEIVER KEYING

THRESHOLD ADJUSTMENT SPECIFICATION

	Date
Prepared	4-4-62
Approved	4-5-62
Approved	

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

Equipment Required

Two-tone Generator

Two (2) HP 200CD or equivalent

Tektronix 531A scope

Tektronix Type B plug-in unit

Simpson 260A V. O. M. or equivalent

Frequency Counter

Audio Attenuator 0 to 100 db (1 db stops)

Alignment Procedure

1. Calibrate two-tone generator as per specification 100-1-10-017
2. Remove AGC card No. 2 and adjust R1, R4, R7, R10 and R-13 to midrange using the V. O. M.
3. Replace AGC card No. 2 in socket.
4. Set R11, R13, R15, R17, and R19 on AGC card No. 1 to Maximum CW position.
5. Set receiver gain control to maximum CW position.
6. Connect two-tone generator output to attenuator input and attenuator output to receiver input (J3-F and J3-E).
7. Set attenuator to 37 db.
8. Set function switch to receive position.
9. Adjust audio oscillator No. 1 to 1400 $\pm$ 1 cps and audio oscillator No. 2 to 1800 $\pm$ 1 cps.
10. Adjust R3-1 (Detector card No. 1) to give 6.8 v. peak-peak at TP4.
11. Adjust R3-5 (Detector card No. 5) to give 6.8 v. peak-peak at TP8
12. Set output control No. 2 on two-tone generator for 3.4 V peak-peak at TP8.
13. Connect oscilloscope to TP10.
14. Adjust R19 (AGC card No. 1) until a steady train of pulses (25 cps) is observed on oscilloscope at TP10.
15. Connect oscilloscope to TP14.
16. Adjust R11 (AGC card No. 1) for a random pulse train at TP14.
17. Reset output control No. 2 on two-tone generator for 6.8 V peak-peak at TP8.

25X1

25X1

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

25X1

18. Set output control No. 1 on two-tone generator for 3.4 V peak-peak at TP4.
19. Confirm steady train of pulses (25 pps) at TP14.
20. Connect oscilloscope to TP10.
21. Adjust R19 (AGC card No. 1) for a random pulse train at TP10.
22. Reset output control No. 1 on two-tone generator for 6.8 V peak-peak at TP4.
23. Set audio oscillator No. 2 to 1700 $\pm$ 1 cps.
24. Reset output control No. 2 on two-tone generator for 0.1 V. peak-peak at attenuator.input (disconnect audio osc. No. 1 for this adjustment)
25. Adjust R3-4 (Detector card No. 4) to give 6.8 V. peak-peak at TP7.
26. Set output control No. 2 on two-tone generator for 3.4 V. peak-peak at TP7.
27. Connect oscilloscope to TP13.
28. Adjust R13 (AGC card No. 1) for a random pulse train at TP13.
29. Set audio oscillator No. 2 to 1600 $\pm$ 1 cps.
30. Reset output control No. 2 on two-tone generator to 0.1 V. peak-peak at attenuator input (disconnect audio osc. No. 1 for this adjustment).
31. Adjust R3-3 (Detector card No. 3) to give 6.8 V. peak-peak at TP6.
32. Set output control No. 2 on two-tone generator for 3.4 V. peak-peak at TP6.
33. Connect oscilloscope to TP12.
34. Adjust R15 (AGC card No. 1) for a random pulse train at TP12.
35. Adjust audio osc. No. 1 to 1800 $\pm$ 1 cps and audio oscillator No. 2 to 1500 $\pm$ 1 cps.
36. Adjust output controls No. 1 and No. 2 on two-tone generator for 0.1 V. peak-peak per tone into the attenuator (see 100-1-10-017).
37. Confirm 6.8 V. peak-peak output at TP8 readjust output No. 1 on two-tone generator as necessary.
38. Confirm steady train of pulses (25 pps) at TP14.
39. Adjust R3-2 (Detector card No. 2) to give 6.8 V. peak-peak at TP5.

25X1

25X1

100-1-10-020

SHEET 2 OF 3 SHEETS

REV.

TITLE

RECEIVER KEYING

THRESHOLD ADJUSTMENT SPECIFICATION

Date

4-4-'62

Prepared

Approved

Approved

25X1

SECRET

40. Adjust output No. 2 on two-tone generator for 3.4 V. peak-peak at TP5.

41. Connect oscilloscope to TP11.

42. Adjust R17 (AGC card No. 1) for a random pulse train at TP11.

43. Adjust output No. 2 for 6.8 V. peak-peak at TP5.

44. Confirm steady train of pulses (25 pps) at TP14 and TP11.

ADJUSTMENT COMPLETE

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

100-1-10-020
SHEET 3 OF 3 SHEETS
REV.
TITLE
RECEIVER KEYING
THRESHOLD ADJUSTMENT SPECIFICATION

	Date
Prepared	4-4-'62
Approved	
Approved	

25X1

25X1

25X1

SECRET

100-1-10-020
SHEET 1 OF 2 SHEETS
REV.
TITLE RECEIVER TEST CHECK LIST

Keying Threshold

Project 100-1
Date ____________
Serial No. ____________
Test Operator ____________

Step	Completed 1st Run	2nd Run
1.	Check ______	----------
2.	Check ______	----------
3.	Check ______	----------
4.	Check ______	----------
5.	Check ______	----------
6.	Check ______	----------
7.	Check ______	----------
8.	Check ______	----------
9.	Check ______	Check ______
10.	Check ______	----------
11.	Check ______	----------
12.	Check ______	Check ______
13.	Check ______	Check ______
14.	Check ______	Check ______
15.	Check ______	Check ______
16.	Check ______	Check ______
17.	Check ______	Check ______
18.	Check ______	Check ______
19.	Check ______	Check ______
20.	Check ______	Check ______
21.	Check ______	Check ______
22.	Check ______	Check ______
23.	Check ______	Check ______
24.	Check ______	Check ______
25.	Check ______	Check ______

25X1

25X1

Date 4-4-62
Prepared
Approved
Approved

SECRET

25X1

100-1-10-020 SHEET 2 OF 2 SHEETS REV.

TITLE RECEIVER TEST CHECK LIST

NOT RELEASABLE TO FOREIGN NATIONALS

Step	Completed 1st Run	2nd Run	Serial No.
26.	Check	Check	
27.	Check	Check	
28.	Check	Check	
29.	Check	Check	
30.	Check	Check	
31.	Check	Check	
32.	Check	Check	
33.	Check	Check	
34.	Check	Check	
35.	Check	Check	
36.	Check	Check	
37.	Check	Check	
38.	Check	Check	
39.	Check	Check	
40.	Check	Check	
41.	Check	Check	
42.	Check	Check	
43.	Check	Check	
44.	Check	Check	

25X1

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

25X1

Date 4-4-'62

Prepared

Approved

Approved

25X1

100-1-10-020

SECRET

100-1-10-016A

REV.

SHEET 1 OF 2 SHEETS

TITLE
RECEIVER MINIMUM KEYING THRESHOLD
ADJUSTMENT SPECIFICATION

	Date
Prepared	4-4-62
Approved	4-5-62
Approved	

ALIGNMENT PROCEDURE

(Perform Alignment Procedure 100-1-10-020 before attempting this procedure)

<u>Equipment Needed</u>

Two-tone generator

HP 200CD or equivalent

Tektronix Type 531A scope

Tektronix Type "B" plug-in unit

Frequency counter

1. Calibrate two-tone generator according to test procedure 100-1-10-017.
2. Adjust R1, R4, R7, R10, and R13 (AGC card No. 2) max. CW.
3. Connect two-tone generator output to 600-ohm attenuator and attenuator output to receiver input (J3-F and J3-E)
4. Adjust osc. to 1400 $\pm$ 1 cps. Remove osc. No. 2 input from two-tone generator.
5. Set function switch to receive position.
6. Adjust receiver gain control to max. CW position.
7. Adjust attenuator and/or output control on two-tone generator for 2.0 V. peak-peak at TP-4.
8. Adjust R1 (AGC card No. 2) until pulses at TP10 appear at a random rate. 25X1
9. A. Tune osc. to 1500 $\pm$ 1 cps.

   B. Adjust output control on two-tone generator for 2.0 V. peak-peak at TP5.

   C. Adjust R4 (AGC card No. 2) until pulses at TP-11 appear at a random rate.
10. A. Tune osc. to 1600 $\pm$ 1 cps.

    B. Adjust output control on two-tone generator for 2.0 V. peak-peak at TP6.

    C. Adjust R7 until pulses at TP-12 appear at a random rate.
11. A. Tune osc. to 1700 $\pm$ 1 cps 25X1

    B. Adjust output control on two-tone generator for 2.0 V. peak-peak at TP7.

    C. Adjust R10 until pulses at TP13 appear at a random rate.

SECRET

25X1

NOT RELEASABLE TO FOREIGN NATIONALS

SECRET

12. A. Tune osc. to 1800 $\pm$ 1 cps.

B. Adjust output control on two-tone generator for 2.0 V. peak-peak at TP8.

C. Adjust R13 until pulses at TP14 appear at a random rate.

TEST COMPLETE

Revision A: 1-29-62 Numerous small changes.

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

25X1

25X1

25X1

100-1-10-016A

SHEET 2 OF 2 SHEETS

REV.

TITLE
RECEIVER MINIMUM KEYING THRESHOLD
ADJUSTMENT SPECIFICATION

Date 4-4-'62

Prepared

Approved

Approved

SECRET NOT RELEASABLE TO FOREIGN NATIONALS

Minimum Keying Threshold

Project 100-1
Date ____________
Serial No. ____________
Test Operator ____________

		Completed	
Step		1st Run	2nd Run
1.		Check ________	----------------
2.		Check ________	----------------
3.		Check ________	----------------
4.		Check ________	Check ________
5.		Check ________	Check ________
6.		Check ________	Check ________
7.		Check ________	Check ________
8.		Check ________	Check ________
9.	A.	Check ________	Check ________
	B.	Check ________	Check ________
	C.	Check ________	Check ________
10.	A.	Check ________	Check ________
	B.	Check ________	Check ________
	C.	Check ________	Check ________
11.	A.	Check ________	Check ________
	B.	Check ________	Check ________
	C.	Check ________	Check ________
12.	A.	Check ________	Check ________
	B.	Check ________	Check ________
	C.	Check ________	Check ________

25X1

25X1

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

25X1

100-1-10-016A
SHEET 1 OF 1 SHEETS
REV.
TITLE
RECEIVER TEST CHECK LIST
Date 4-4-'62
Prepared
Approved
Approved

100-1-10-016A

100-1-10-021 | SHEET 1 OF 2 SHEETS | REV.

TITLE RECEIVER THRESHOLD TRACKING MEASUREMENT PROJECT 100-1

	Date
Prepared	4-4-62
Approved	4-5-62
Approved	

NOT RELEASABLE TO FOREIGN NATIONALS

SECRET

Keying Threshold Tracking

Equipment Needed

Two-tone generator

Two (2) 200CD osc. or equivalent

Tektronix 531A scope

Tektronix Type "B" plug-in unit

Counter

Audio attenuator, 0 to 100db (1 db steps)

1. Calibrate two-tone generator as per 100-1-10-017
2. Connect two-tone generator output to attenuator input and attenuator output to receiver input (J3-F and J3-E)
3. Adjust audio osc. No. 1 to 1400 $\pm$ 1 cps.
4. Adjust receiver gain control to max. CW.
5. Adjust attenuator and output control No. 1 on two-tone generator for 12 V. peak-peak at TP4.
6. Check that a steady train of pulses is obtained at TP10-(25 pps)
7. A. Adjust osc. No. 2 to 1800 $\pm$ 1 cps.
   B. Monitor TP14 and adjust output control No. 2 on two-tone generator for a random pulse train at TP14.
   C. Measure peak-peak voltage at TP8. Should be 6.0 V. $\pm$ 0.4 V. peak-peak.
8. A. Adjust osc. No. 2 to 1700 $\pm$ 1 cps.
   B. Monitor TP13 and adjust output control No. 2 on two-tone generator for a random pulse train.
   C. Measure peak-peak voltage at TP-7 should be 6.0 $\pm$ 0.4 V. peak-peak
9. A. Adjust osc. No. 2 to 1600 $\pm$ 1 cps.
   B. Monitor TP-12 and adjust output control No. 2 on two-tone generator for a random pulse train.
   C. Measure peak-peak voltage at TP-6. Should be 6.0 $\pm$ 0.4 V. peak-peak.
10. A. Adjust osc. No. 2 to 1800 $\pm$ 1 cps.
    B. Adjust output control No. 2 on two-tone generator for 12V. peak-peak at TP8.
    C. Confirm steady train of pulses (25 pps) at TP14.

25X1

25X1

25X1

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

SECRET

11. A. Monitor TP-10 and adjust output control No. 1 on two-tone generator for a random pulse train.

    B. Measure peak-peak voltage at TP-4. Should be 6.0 $\pm$ 0.4 V. peak-peak

12. A. Adjust osc. No. 1 for 1500 $\pm$ 1 cps.

    B. Monitor TP11 and adjust No. 1 two-tone generator for random pulse train.

    C. Measure peak-peak voltage at TP-5. Should be 6.0 V. peak-peak $\pm$ 0.4 V.

13. A. Adjust output No. 2 on two-tone generator for 5.0 V. peak-peak at TP8.

    B. Adjust output No. 1 on two-tone generator for random pulse train at TP11.

    C. Confirm steady train of pulses (25 pps) at TP14.

    D. Measure peak-peak voltage at TP4. Should be 2.4 $\pm$ 0.2 V. peak-peak.

14. A. Adjust osc. No. 1 to 1400 $\pm$ 1 cps.

    B. Adjust output No. 1 on two-tone generator for random pulse train at TP10.

    C. Measure peak-peak voltage at TP5, should be 2.5 $\pm$ 0.2 V. peak-peak.

15. A. Adjust output No. 1 on two-tone generator for 5.0 V. peak-peak at TP4.

    B. Confirm steady train of pulses (25 pps) at TP10.

    C. Adjust output No. 2 on two-tone generator for random pulse train at TP14.

    D. Measure peak-peak voltage at TP8 should be 2.5 $\pm$ 0.2 V. peak-peak.

16. A. Adjust osc. No. 2 to 1700 $\pm$ 1 cps

    B. Adjust output No. 2 on two-tone generator for random pulse train at TP13.

    C. Measure peak-peak voltage at TP7 should be 2.5 $\pm$ 0.2 V. peak-peak.

17. A. Adjust osc. No. 2 to 1600 $\pm$ 1 cps.

    B. Adjust output No. 2 on two-tone generator for random pulse train at TP12.

    C. Measure peak-peak voltage at TP6. Should be 2.5 V. $\pm$ 0.2 V. peak-peak

TEST COMPLETE

25X1

25X1

25X1

Date 4-4-'62
Prepared
Approved
Approved

SECRET

100-1-10-021 SHEET 1 OF 1 SHEETS REV.

TITLE RECEIVER THRESHOLD TRACKING MEASUREMENT

Date 4-4-62

Prepared Approved Approved

SECRET

Threshold Tracking

Project 100-1

Date ____________________

Serial No. ____________________

Test Operator ____________________

Step	Completed (Check)		Step		
1.			11	A	
2				B	V.p-p*
3.			12	A	
4.				B	
5.				C	V. p-p*
6.			13	A	
7.	A			B	
	B			C	
	C	V. p-p*		D	V. p-p*
8.	A		14	A	
	B			B	
	C	V. p-p*		C	V. p-p*
9.	A.		15	A	
	B			B	
	C	V. p-p*		C	
10.	A			D	V. p-p*
	B		16	A	
	C			B	
			17	A	
				B	
				C	V. p-p*

* Note: Also record data on 100-1-10-022

25X1

25X1

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

25X1

100-1-10-021

TABLE 5.2 D. C. VOLTAGE MEASUREMENTS

A. AUDIO CARD 1

Transistor	Emitter	Base	Collector
Q1	+8.0 V	+7.9 V	+2.4 V
Q2	+0.3 V	+0.18 V	-12 V
Q3	+0.13 V	0	-12 V
Q4	0	0	-3.8 V
Q5	+0.2 V	+0.13 V	-12 V
Q6	+0.28 V	+0.2 V	-6.8 V

B. AUDIO CARD 2

Q1	+0.09 V	0	-11.5 V
Q2	+0.09 V	0	-11.5 V
Q3	+3.15 V	+3.0 V	-11.2 V
Q4	+0.1 V	0	-12 V

C. DETECTOR CARD 1 - 5
Typical

Q1	+0.72 V	+0.09 V	-12 V
Q2	+0.14 V	0	-6.8 V
Q3	+9.7 V	+9.5 V	-2.9 V
Q4	-3.0 V	-2.9 V	+12 V
Q5	0	-0.65	-0.09 V
Q6	-0.37	-0.09 V	-12 V
Q7	-2.71 V	-2.9 V	-12 V
Q8	+0.1 V	0	-7.0 V

D. AGC CARD 1

Q1	-0.2 V	-0.8 V	-12 V
Q2	-0.13 V	-0.2 V	-11.5 V
Q3	+0.53 V	-0.05 V	-12 V
Q4	-0.68 V	0	+12 V
Q5 - Q9	-0.6 V	-0.68 V	-12 V

E. LOGIC CARD

Q1	-3.4 V	-3.4 V	-12 V
Q2	-3.41 V	-3.4 V	-12 V

F. TBI

Transistor	Emitter	Base	Collector
Q1	+0.26 V	+0.14 V	-12 V
Q2	+0.14 V	0	-12 V

G. TB2

Transistor	Emitter	Base	Collector
Q1	-5.2 V	-5.8 V	-12 V
Q2	-9.1 V	-8.4 V	+1.8 V

NOTE: All measurements taken with HP 410B VTVM
Referenced to chassis ground.
Gain control set full max. c.w.
All other variables set for normal operation
No signal input.

WAVEFORM LIST

5.2.1		
	A. - J 1 (2 tone gen.)	-output, two tone generator
	B. - TP 4 through TP 8(Typ.)	-tone channel output
5.2.2		
	Detector Card, Q6 Emitter (typ.)	-Schmitt trigger drive
5.2.3		
	Detector Card, Q5 Base	-Envelope of detected tone
5.2.4		
	Z1 through Z5, pin 7 (typ.)	-Schmitt trigger output
5.2.5		
	Z6 through Z10, pin 7 (typ.)	-20 ms one shot output
5.2.6		
	TP 10 through TP 14 (typ.)	-"Mark" pulse to perforator
5.2.7		
	A. Z13 pin 8 Typ.	-10 ms delay one shot output
	B. Z14 pin 7 Typ.	-Sprocket pulse
5.2.8		
	A. J 1, output, two tone generator	
	B. P 103 through P 107, Pin 14 (typ.)	-AGC attack characteristics
5.2.9		
	P 103 through P 104, Pin 14 (typ.)	-AGC release characteristic

RECEIVER 100-I

FIGURE 5.2.1

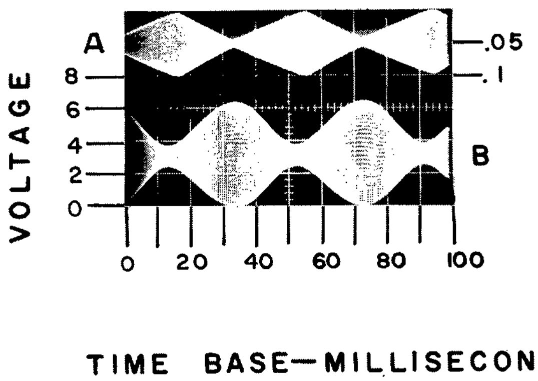


FIGURE 5.2.2

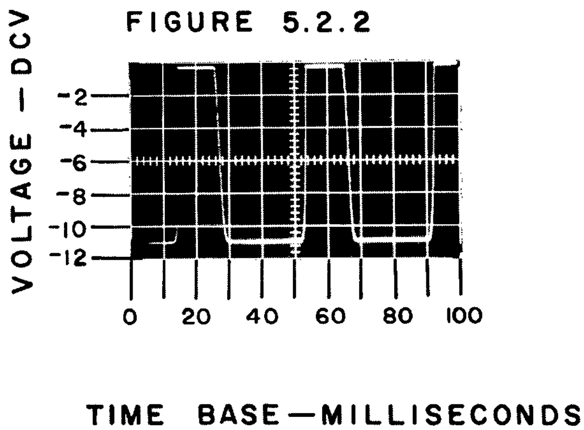


FIGURE 5.2.3

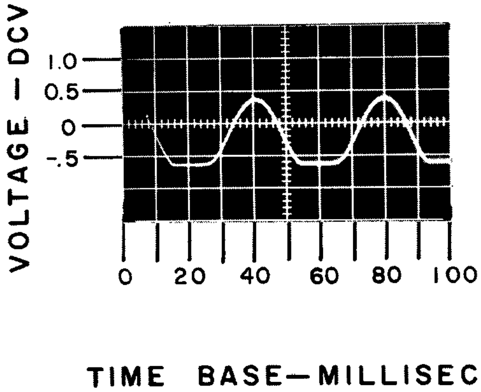
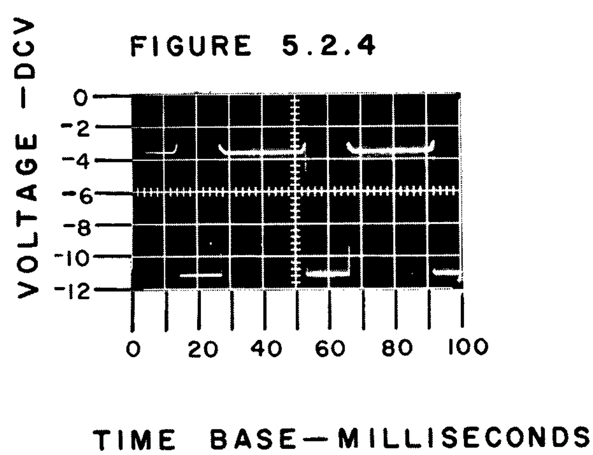


FIGURE 5.2.4



RECEIVER 100-1

FIGURE 5.2.5

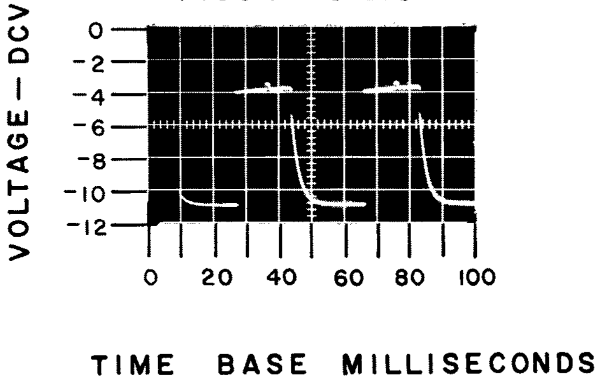


FIGURE 5.2.6

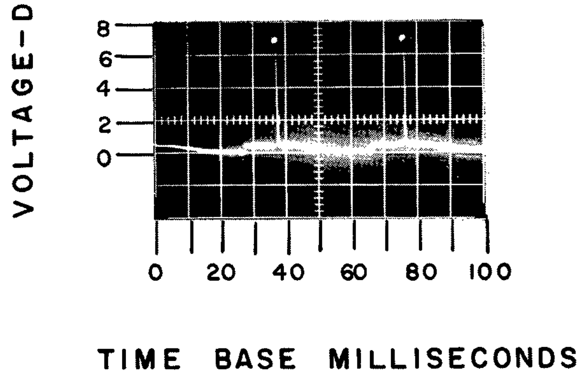


FIGURE 5.2.7

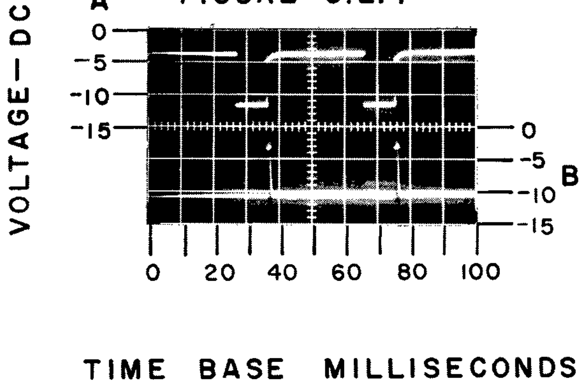


FIGURE 5.2.8

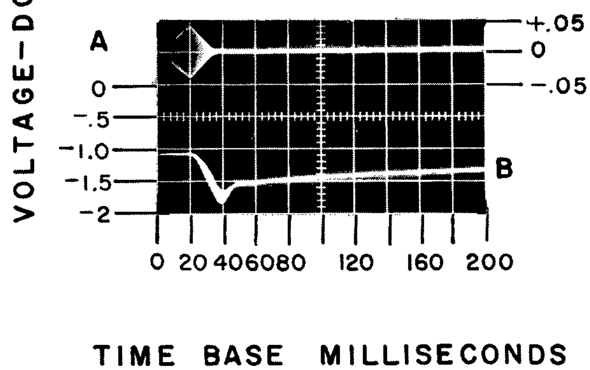
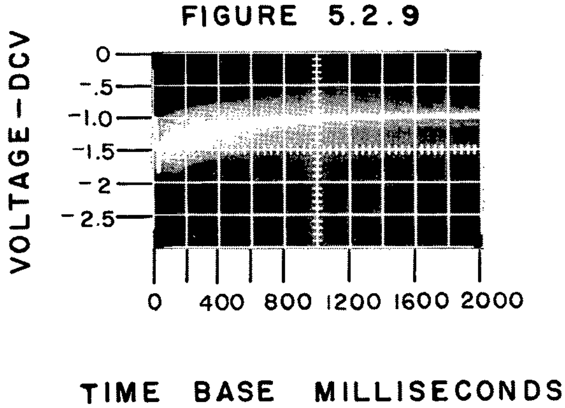


FIGURE 5.2.9



6.0 THEORY OF OPERATION, RECEIVER

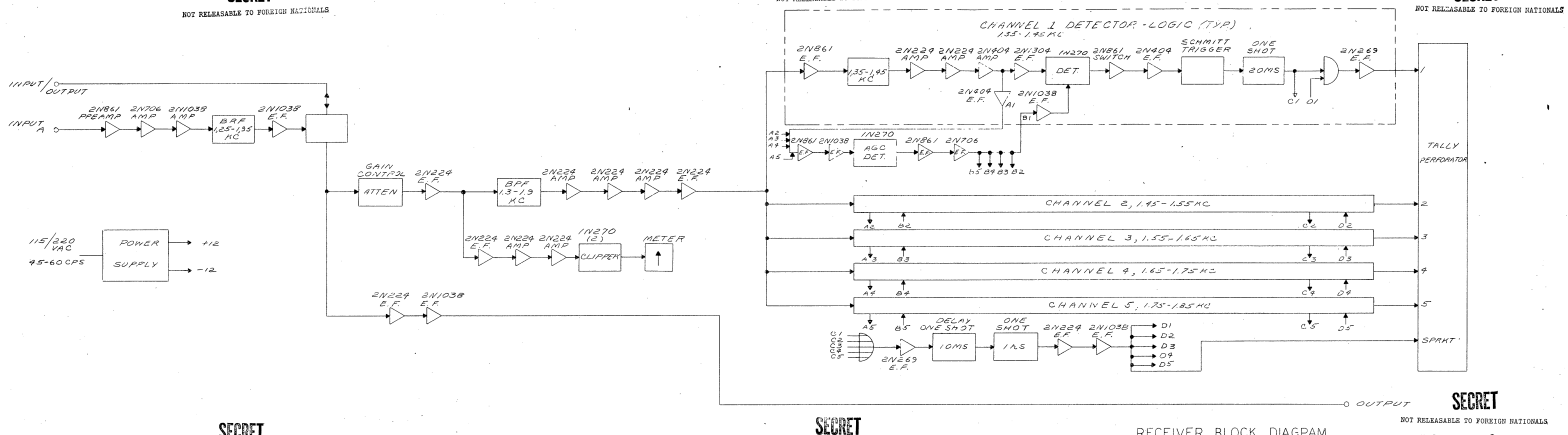
6.1 GENERAL DESCRIPTION

An over-all block diagram of the receiver is shown in Figure 6.2 and a detailed schematic diagram in Figure 100-1-04-034. Input signals consisting of notched speech plus information tones are applied to the receiver via a public telephone system. The message information detected by the receiver is contained within the 1300 to 1900 cps frequency band. Message signals are transmitted to the receiver at low amplitude, about 27 db below the rms level of the 300 to 3000 cps voice signal.

The received message consists of alpha-numerical characters in standard five-baud teletype code. The five bauds comprising each character are transmitted simultaneously in the form of 40-millisecond pulses having a triangular shape. A separate carrier frequency is used for each of the five pulses. The five carrier frequencies are:

1400 cps
1500 cps
1600 cps
1700 cps
1800 cps

Bandpass filters are used in separate amplifier channels to separate the individual code pulses from the composite signal. The detected and amplified pulses are supplied to logic circuits which drive a Tally Paper Tape Perforator. The receiver is capable of processing input code groups at any rate up to 25

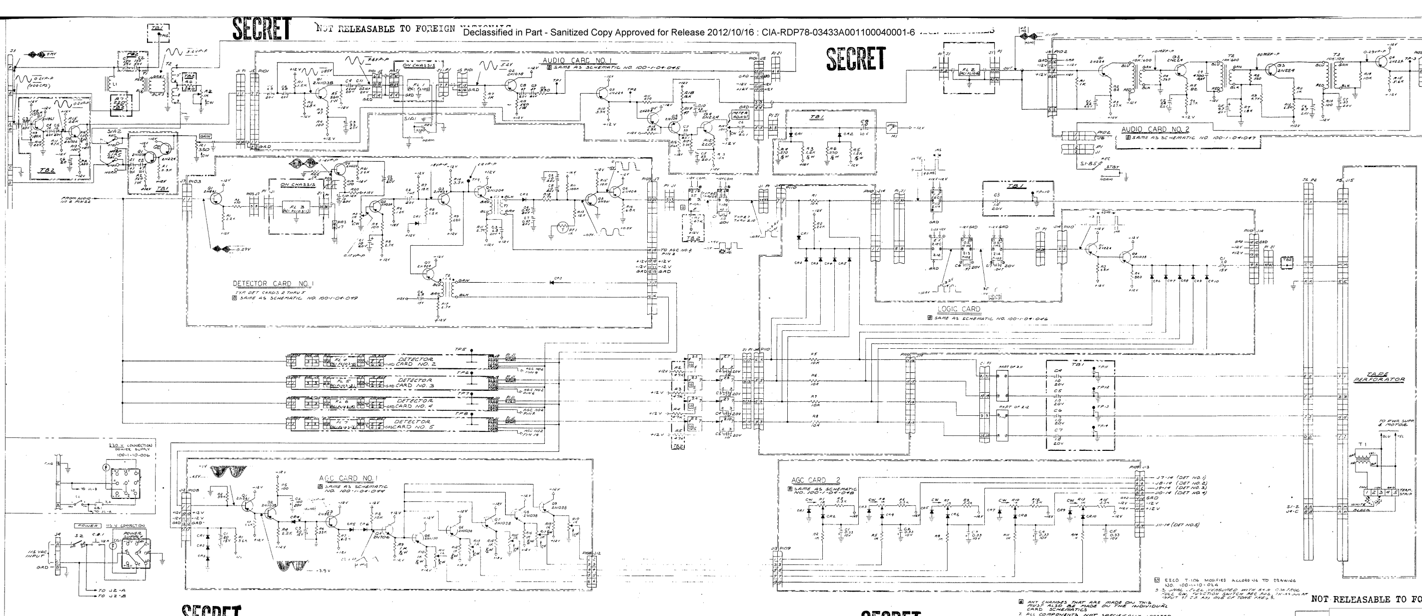


RECEIVER BLOCK DIAGRAM
PROJECT 100-1 PHASE I

FIGURE 6.0A
100-1-10-036

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS



SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

10 EECO T-106 MODIFIED ACCORDING TO DRAWING NO. 100-1-10-024

9. SIGNAL LEVEL MEASURED WITH GAIN CONTROL FULL CW, FUNCTION SWITCH REC POS., INPUT AT J3 ANY ONE OF TONE FREQ'S.

8 ANY CHANGES THAT ARE MADE ON THIS MUST ALSO BE MADE ON THE INDIVIDUAL CARD SCHEMATICS

7. ALL COMPONENTS NOT SPECIFICALLY LOCATED ARE EITHER ON CHASSIS OR FRONT PANEL

6. ALL DIODES ARE 1N270.

5. REFERENCE DESIGNATIONS ARE ABBREVIATED PREFIX THE DESIGNATION WITH THE UNIT NUMBER.

4. INDICATES ZENER DIODE

3. FOR ASSEMBLY DRAWING SEE

2. ALL CAPACITANCE VALUES ARE IN MICROFARADS

1. ALL RESISTANCE VALUES ARE IN OHMS, 1/4 WATT

NOTES: UNLESS OTHERWISE SPECIFIED—

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

100-1-04-034 B

25X1

25X1

SCHEMATIC DIAGRAM - RECEIVER

11-21-61

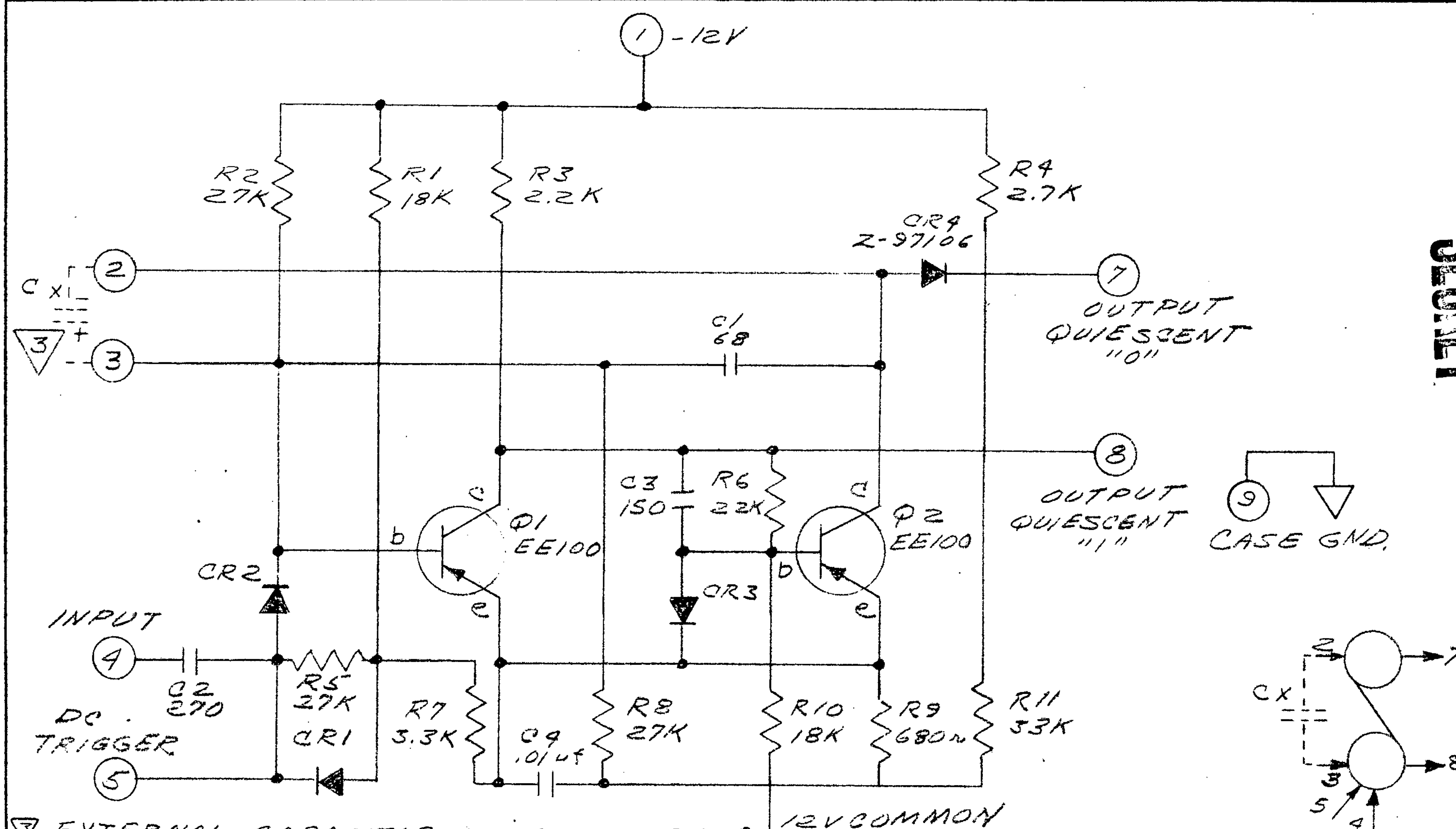
100-1-04-034

Prepared	•	Date 4.13-62
Approved		
Approved		

100-1-10-033

SHEET OF SHEETS | REV.

TITLE
SCHEMATIC DIAGRAM
ONE SHOT (EECO T-105A)



3 EXTERNAL CAPACITOR Cx, TO DETERMINE OUTPUT PULSE DURATION Cx=50(t-2) t IN μ SEC; Cx IN PF.
2. ALL CAPACITORS ARE IN PICO FARADS
1. ALL RESISTORS ARE 1/4 WATT.
NOTES: UNLESS OTHERWISE NOTED

5. Q1 & Q2 MAY BE REPLACED WITH 2N428.
4. CR1-CR3 ARE 1N191 OR Z-97106

25X1

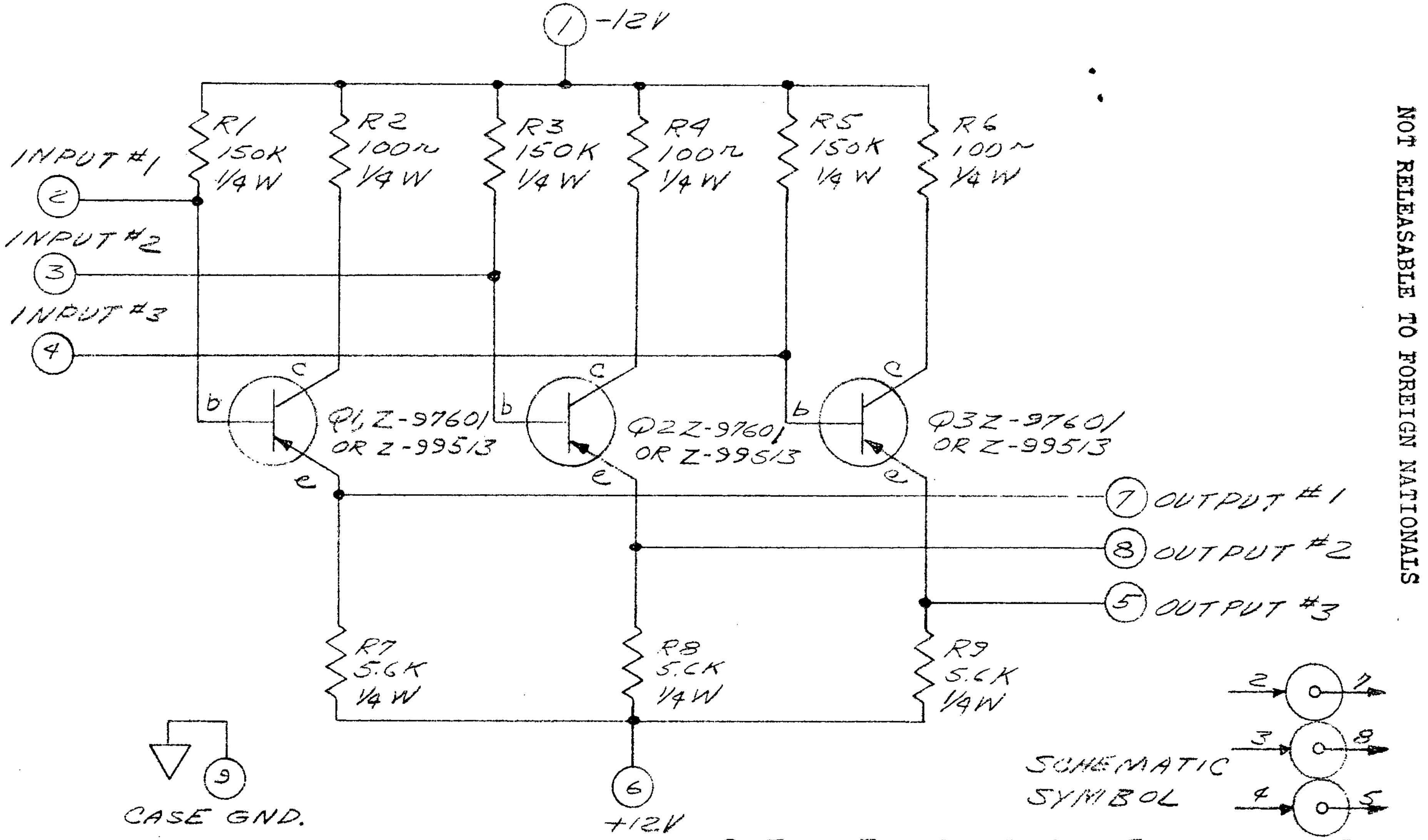
25X1

Prepared		Date 4-13-62
Approved		
Approved		

100-1-10-034

SHEET OF SHEETS REV.

TITLE
SCHEMATIC DIAGRAM
EMITTER FOLLOWER (EECO T-113)



NOTES:
1. HEAT SINK TO BE USED ON Q1, Q2, & Q3 IF Z-97601 IS USED
2. Z-99513 CASE TO BE INSULATED

25X1

25X1

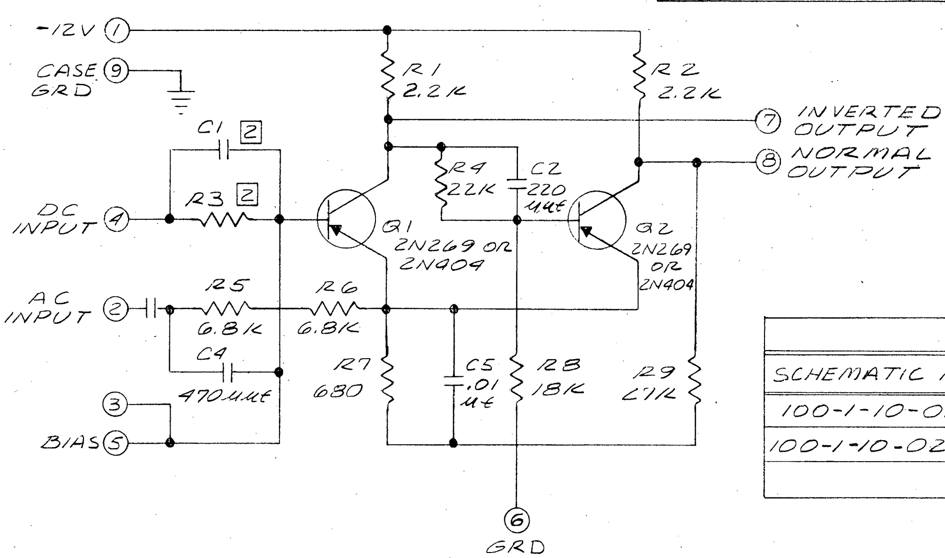
SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

100-1-10-024 REV

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.

NOT RELEASABLE TO FOREIGN NATIONALS



TABULATION		
SCHEMATIC NO.	COMPONENT	
	C1	R3
100-1-10-024-1	220μμf	10K
100-1-10-024-2	.001μf	4.7K

25X1

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

3. FOR -2 MODIFICATION SEE DWG 100-1-09-050

[2] SEE TABULATION BLOCK FOR VALUES

1. ALL RESISTORS ARE IN OHMS, 1/4 WATT

NOTES: UNLESS OTHERWISE SPECIFIED

TOLERANCES (EXCEPT AS NOTED)	
DECIMAL ±	APPROVED BY
FRACTIONAL ±	TITLE SCHEMATIC DIAGRAM - EECO T106 SQUARING AMPL.
ANGULAR ±	DATE 2-8-62 / DRAWING NUMBER 100-1-10-024

K+E 195LFE-3 ALDANENE ENGINEERS' STANDARD FORM

SECRET NOT RELEASABLE TO FOREIGN NATIONALS

MADE IN U.S.A. 29116

characters per second, or approximately 250 words per minute. The receiver output is a punched paper tape suitable for use on any standard teletype printer.

The receiver utilizes a special sliding-threshold agc circuit which provides a constant output from each of the five detector channels over a dynamic range of 10 db. A manual gain control circuit and VU meter provide for adjustment of the input signal amplitude to compensate for the wide variations between local and long-distance transmissions.

An Engineered Magnetics Model EM1140B regulated power supply provides operating voltages for the receiver.

6.2 Detailed Description

6.2.1 Input-Output Circuit

The input-output circuit of the receiver consists of the output amplifier and band-rejection filter which notches the voice spectrum of the receiving station operator to prevent errors in the received message; the input circuit for the receiver; and coupling circuits which permit the use of a single-pair transmission line for the two-way conversation.

The voice signal from the receiver telephone is applied to pin A of J3 in the receiver. This signal is generated in a high-impedance crystal microphone which develops a peak-to-peak voltage of about 200 millivolts across a load impedance of 75 K ohms presented by R9 and the input impedance of Q1, both of which are located on TB2. The conventional carbon microphone normally used in the telephone is replaced to minimize distortion and to reduce the possibility of false alarm errors in the received message

The need for low distortion in this application is obtained from the following considerations. The spectrum of normal speech is highly peaked in the region below 700 cps and decreases rapidly at frequencies above 1000 cps. When the speech is distorted (distortion in a carbon microphone is as much as 30%), however, the spectrum tends to flatten and additional energy appears above 1000 cps. Since the voice signal, due to the local speaker, is already 20 db stronger than that of the distant speaker, and since the notch filter (FL1) has finite attenuation in the message bandwidth, distortion in the local speaker's voice can cause a significant number of errors to occur whenever the receiving operator speaks. The use of a linear crystal microphone minimizes this effect.

Additional isolation of the local speaker's voice from the receiver input is provided by the hybrid transformer T2 which is described in detail in the later part of this section.

Returning to the input circuit, the voice signal from the microphone passes through emitter follower Q1 on TB2. This signal is applied to the base of Q2 where it is amplified to a level of about 850 millivolts peak-to-peak. After further amplification in Q1 (audio card No. 1), the speech signal passes through the band reject filter FL1 which attenuates speech energy in the 1300 to 1900 cps message bandwidth when the function switch is in the RECEIVE or STANDBY position. In the normal position the un-notched signal at the base of Q1 by-passes the notch filter via S1-A1 and is supplied directly to Q2 base on audio card No. 1. Q2 is an emitter follower that isolates the band-reject filter from line impedance variations. The output of this stage is fed through a 330-ohm resistor (R9) to hybrid transformer T2. R9 plus the source impedance of emitter follower Q2 add to yield a resistance of about 350 ohms, which is just equal to the resistance of gain control R1 (front panel). Hybrid transformer T2 is exactly balanced when R2 (chassis, Figure 8.1) plus R6 (TB2) just equals the line resistance. When this occurs, the voltage drop across R6 - R2 is exactly equal to and 180° out-of-phase with the voltage across pins 7 and 9 of T2. Consequently, no current flows in R1 (gain control) due to a signal applied to pin 4 of T2. (Since the line impedance varies for different telephone circuits, the balance is not perfect and some feed-through occurs.) Instead, the signal is coupled through T2 to T1, where it is delivered to the telephone line for transmission to the transmitter station.

The incoming voice signal arriving from the transmitter station is applied to the telephone earpiece through terminal D of J3. In the "NORM" mode, this voice signal is applied directly from terminal 9 of the transformer T2 to J3-D, through contacts of S1-A2 and S1-A5. In the "STANDBY" and "RECEIVE" modes, emitter followers Q1 and Q2 on terminal board TB1 are placed in series with the voice signal output at T2-9. In these modes, the received signal is also applied to GAIN CONTROL R1 in the receiver input channel. The emitter followers provide isolation between the receiver input channel and the earpiece to minimize distortion and voice feed-through[1].

Note 1: The earpiece in the receiver telephone acts like a low-efficiency microphone without isolation; unnotched speech can appear at the input to the information channel and can cause false alarm errors.

In the "STANDBY" and "RECEIVE" modes, voice input signals received over the external telephone transmission lines at J3-E and -F are coupled through transformers T1 and T2 to the emitter followers and the receiver GAIN CONTROL R1.

6.2.2 Receiver Input Channel

The receiver input channel consists of a gain control, a signal-level monitoring circuit, and a preamplifier. GAIN CONTROL R1 provides a means of adjusting the input signal level to compensate for the variation between local and remote transmissions. For local signals, the maximum peak-to-peak amplitude of voice input signals may be as high as 3 volts; for input signals from remote transmitters, the input may be as much as 20 db below this level, or about 300 millivolts peak-to-peak.

To permit proper adjustment of GAIN CONTROL R1, a signal-level monitoring circuit is provided. The monitoring circuit consists of emitter follower Q5, amplifiers Q6 and Q4, a peak clipper circuit, and VU meter M1. The transistor stages are mounted on audio card No. 1, the clipper and meter circuits on terminal board TB1. The voice input signal at the arm of GAIN CONTROL R1 is applied to the monitoring circuit through emitter follower Q3, which also drives the preamplifier circuit.

Emitter follower Q5 at the input to the monitoring circuit drives a two-stage cascade amplifier, Q4 and Q6, the output of which is applied to METER ADJUST potentiometer R14. This potentiometer provides a means of calibrating the VU meter. The amplified output at the arm of R14 is coupled by C6 and C5 to VU meter M1.

Positive and negative peak clippers are connected across the output to protect the meter against high-amplitude peak signals. The clipper diodes, CR1 and CR2 on terminal board TB1, are back-biased by voltage divider resistors R4 through R7, so that only high-amplitude peaks of the signal cause the diodes to conduct.

The dial of VU meter M1 is marked to indicate the optimum signal level, and GAIN CONTROL R1 is adjusted so that the meter reading coincides with this mark. Since the ratio between average level of the voice signal and the low-level message signal is nearly constant, this adjustment brings the input signal amplitude within the limits of the dynamic AGC range of the receiver.

The preamplifier circuit consists of bandpass filter FL2, and a three-stage amplifier and emitter follower located on audio card No. 2. The bandpass filter passes the low-level message pulses within the 1300 to 1900 cps band, and rejects all components of the voice signal.

The three-stage preamplifier, consisting of transistors Q1, Q2 and Q3 on audio card No. 2, provides approximately 60 db of gain for the 1300 to 1900 cps signal components. An over-all gain of approximately 100 db is required for the receiver; however, the preamplifier gain is limited to 60 db in order to maintain linearity and to prevent intermodulation distortion. Intermodulation distortion might occur if two tones were received simultaneously, or if an exceptionally strong signal outside the message band were not attenuated sufficiently by the bandpass filter. This could cause a false output from one or more of the five detector channels, and in turn cause an incorrect character to be punched by the Tally perforator.

The input signals to the preamplifier consist of triangular pulses of 40-milliseconds duration, at five different carrier frequencies, spaced 100 cps apart, from 1400 to 1800 cps. Transformer coupling is used between the three amplifier stages and between the third stage and output emitter follower Q4. Thermistor RT1 in the emitter of Q3 provides compensation for gain variations with temperature changes. The preamplifier is disabled by the operating mode selector switch, except in the "RECEIVE" mode. When S1 is set to either "NORM" or "STANDBY", the emitter of amplifier Q4 is shorted to ground through contacts of S1-B5. In "RECEIVE" mode, the short is removed allowing Q4 to conduct.

The output of the preamplifier circuit is applied from the emitter of Q4, through J6-22 to the inputs of the five audio detector channels.

6.2.3 Audio Detector Channels

The five audio detector channels provide further amplification of the message pulses. All five detector cards are identical except for the bandpass filter at the input of each card which selects only one of the five modulated frequencies. Each bandpass filter has a 3-db bandwidth of 100 cps. Since the five detector cards are identical, only detector card No. 1 will be described.

The input signal to the detector card consists of the amplified message signal from emitter follower Q4 in audio card No. 2.. This signal is applied through J7-1 to emitter follower Q1, which provides an impedance match between the preamplifier output and bandpass filter FL3, and isolates the input circuits of the five detector cards.

The bandpass filter FL3 has a bandwidth of 100 cps, centered at 1400 cps, so that only the 1400-cps message pulses are coupled to the first amplifier stage Q8. Amplifiers Q8, Q2, and Q3 in cascade provide 40 to 50 db of amplification of the 1400-cps signal. Potentiometer R3 at the input to transistor Q2 provides a gain adjustment for the amplifier circuit. The narrow bandwidth of the amplifier eliminates all intermodulation distortion, since no two signals within the 100-cps band can generate a cross-product that might be interpreted as a valid signal.

The amplified 1400-cps signal at the collector of Q3 is applied in parallel to emitter followers Q4 and Q7. Emitter follower Q4 drives the diode detector, and Q7 supplies one of the five input signals to the AGC circuit. (See paragraph 6. 2. 5) Emitter follower Q4 and transformer T1 provide a low-impedance charging source for the RC network at the output of the detector. Detector diode CR 2 is back-biased by the AGC circuit, through the secondary winding of T1. Capacitor C1 in AGC card No. 2 provides an AC ground return for the secondary of T1. The AGC circuit establishes both a minimum and a dynamic threshold bias level on the detector.

Capacitors C4 and C7, connected across the detector output, are charged very rapidly to the peak value of the input signal, through the low-impedance source of T1 and Q4. A delay is introduced, however, by the RC time constant of resistor R18 and series capacitors C5 and C8. This delay provides sufficient time for the AGC circuit to respond to the input signal, and also prevents any stray noise pulses of short duration from exceeding the trigger threshold. Thermistor RT1 forms a part of the voltage divider which establishes the bias level for diode detector CR2 and switching transistor Q5. The thermistor acts to maintain this bias at a constant level over a wide range of temperature variation.

Switching transistor Q5 is normally conducting. When an incoming signal pulse exceeds the AGC threshold, CR2 conducts and a positive-going signal is coupled to the base of Q5, cutting off the transistor. This produces a negative-going pulse at the collector of Q5 and at the output of emitter follower Q6. The negative-going output of Q6 is coupled via P103-22 to a Schmitt trigger at the input to the control logic circuits.

During any 40-millisecond interval, a negative-goint output pulse from any of the five detector cards represents a binary 1, or true signal; conversely, the absence of a pulse represents a binary 0, or false signal. The combination of the five outputs represents the teletype code for a particular alphabetical or numerical character in the incoming message.

6.2.4 Control Logic Circuits

The control logic circuits respond to the outputs of the five detector channels to provide simultaneous 1-millisecond output pulses to the perforator. The logic circuits include a 10-millisecond delay which allows sufficient time for detection of signals in all five channels, and a 1-millisecond one-shot multivibrator which synchronizes the outputs of the five channels.

Assuming that a signal above threshold level is detected in channel 1, a negative-going output signal will be coupled from the emitter of Q6 in detector card No. 1, through P103-22 to the channel-1 Schmitt trigger Z1. Because of the delay in the detector circuit, the transition from the false to true state is relatively slow; the Schmitt trigger, however, provides an output pulse with a very fast rise time. This output pulse is coupled to the channel-1 20-millisecond one-shot multivibrator, Z6. Identical Schmitt trigger circuits, Z2 through Z5, and 20-millisecond one-shots, Z7 through Z10, are provided for the other four detector channels.

The output of the channel-1 20-millisecond one-shot, designated Z6, is combined in an AND gate with the Z14 term from a timing circuit. The Z6 term becomes true when the 20-millisecond one-shot fires; the Z14 term becomes true 10 milliseconds later, for a period of 1 millisecond. During the 1-millisecond period when both Z6 and Z14 are true, an output pulse is coupled to the perforator by emitter follower Z11-A. At the end of the 20-millisecond period of Z6, the circuit returns to the quiescent, or off, state, ready to respond to the next incoming signal. In the same manner, 1-millisecond output pulses are delivered simultaneously to the perforator from all other channels where a signal was detected.

The timing circuit,which synchronizes the five channels, consists of an OR gate, a 10-millisecond delay one-shot, a 1-millisecond one-shot, and associated emitter followers. The output signals from the 20-millisecond one-shots in the five signal channels are combined in the OR gate, comprising CR1 through CR5 in the logic card. If any one of the inputs to the OR gate is true, the 10-millisecond one-shot Z13 is triggered. This one-shot provides a 10-millisecond delay to allow time for all five detector channels to respond to an input signal. Normally, all five bits for each character in the message code are transmitted simultaneously; however, the transmission time for each of the five carrier frequencies may vary several milliseconds when the signals are transmitted over long distances.

At the end of the 10-millisecond delay, the trailing edge of the one-shot output triggers the 1-millisecond one-shot Z14. The 1-millisecond output pulse from Z14 is applied to emitter followers Q1 and Q2 in cascade, on the logic card. Emitter follower Q2 provides the D1, D2, D3, and D4 and D5 terms for the output AND gate in each signal channel, as described above. The output of Q2 is also coupled by capacitor C1, through P110-8 and J1-40, to the Tally perforator. This signal is applied through a delay circuit to the sprocket drive in the perforator to advance the tape one step after the appropriate code has been punched.

6.2.5 AGC Circuit

The AGC circuit in the receiver provides a sliding-threshold voltage for each detector channel, to provide positive triggering of the control logic circuits over a 10-db dynamic range of input signal variations.

As described in paragraph 6.2.3, the amplified signal at the collector of Q3 in each detector card is applied to emitter follower Q7. The output of Q7 is coupled to the AGC circuit through transformer T2 and diode CR3, which comprises one element of an OR gate. The combined signals from all five detector circuits are applied through the OR gate to the base of emitter follower Q1 on AGC card No. 1. The level of AGC voltage developed by the circuit is determined by the input signal having the highest amplitude. Two emitter followers, Q1 and Q2 on AGC card No. 1, are connected in cascade to provide isolation of the input circuit and a low-impedance source for the AGC detector. The response of the AGC circuit is sufficiently rapid to follow the linear rise of the triangular modulation envelope of the input signal.

Diodes CR1, CR2 and CR3 provide temperature compensation for emitter followers Q1 and Q2, and AGC detector diode CR4. Diode CR4 rectifies the input signal, and the negative AGC output voltage is developed across a filter network comprising C3 and R6. Two additional emitter followers, Q3 and Q4, provide sufficient power to drive the five parallel output stages. Emitter followers Q5 through Q9 provide a separate AGC output circuit for each of the five signal channels. A potentiometer in the emitter circuit of each output stage permits separate adjustment of the AGC voltage supplied to each channel, to provide compensation for variations in gain between channels, and for differences in input signal levels at the different modulation frequencies. Diodes CR5 and CR6 in series between Q3 and Q4 provide temperature compensation for the output stages.

The five outputs from AGC card No. 1 are coupled to AGC card No. 2, where each is combined with a fixed bias circuit. The fixed bias circuit establishes a minimum threshold voltage for the associated detector channel. For detector channel 1, the minimum threshold is established by the setting of potentiometer R1, which forms part of a voltage divider connected across the -12 volt supply. The minimum threshold is adjusted to optimum level and applied through isolation diode CR2 to transformer T1 on detector card No. 1. When the AGC voltage from Q9 and potentiometer R19 in AGC card No. 1 is less than the fixed bias level, the AGC voltage has no effect. However, when the AGC voltage exceeds the fixed bias or minimum threshold, CR2 is biased off and the AGC voltage is applied to the channel 1 detector. Diode CR1 provides temperature compensation for CR2, and acts to maintain a constant level of fixed bias.

The bias circuits for channels 2 through 4 are identical to the channel-1 circuit.

The action of the AGC circuit is such that signals having a peak amplitude less than the minimum threshold established by the fixed bias circuit cannot produce a detector output signal. Signals having a peak amplitude greater than the minimum threshold produce a detector output signal which is held nearly constant over an input range of 10 db.

6.2.6 Power Supply

The EM1140B power supply provided with the receiver converts 115 volt, 60 cycle power to $\pm$ 12 volts regulated DC power and -24 volts unregulated DC power. (The -24 volt output is not used.) An electrical schematic of the circuit is shown in Figure 6.2. One power transformer is used for all outputs to minimize weight and size.

Since the two regulated sections are identical, only one section will be described. Input power is fed to a step-down transformer. The reduced voltage is rectified in a full-wave bridge circuit and filtered by a choke input filter. This rectifier circuit minimizes peak inverse voltages and peak currents for safe operation of the diodes.

The regulator section consists of a comparison circuit, error signal amplifier, bias supply, and series regulating transistor. The comparison circuit is a bridge consisting of two resistors,

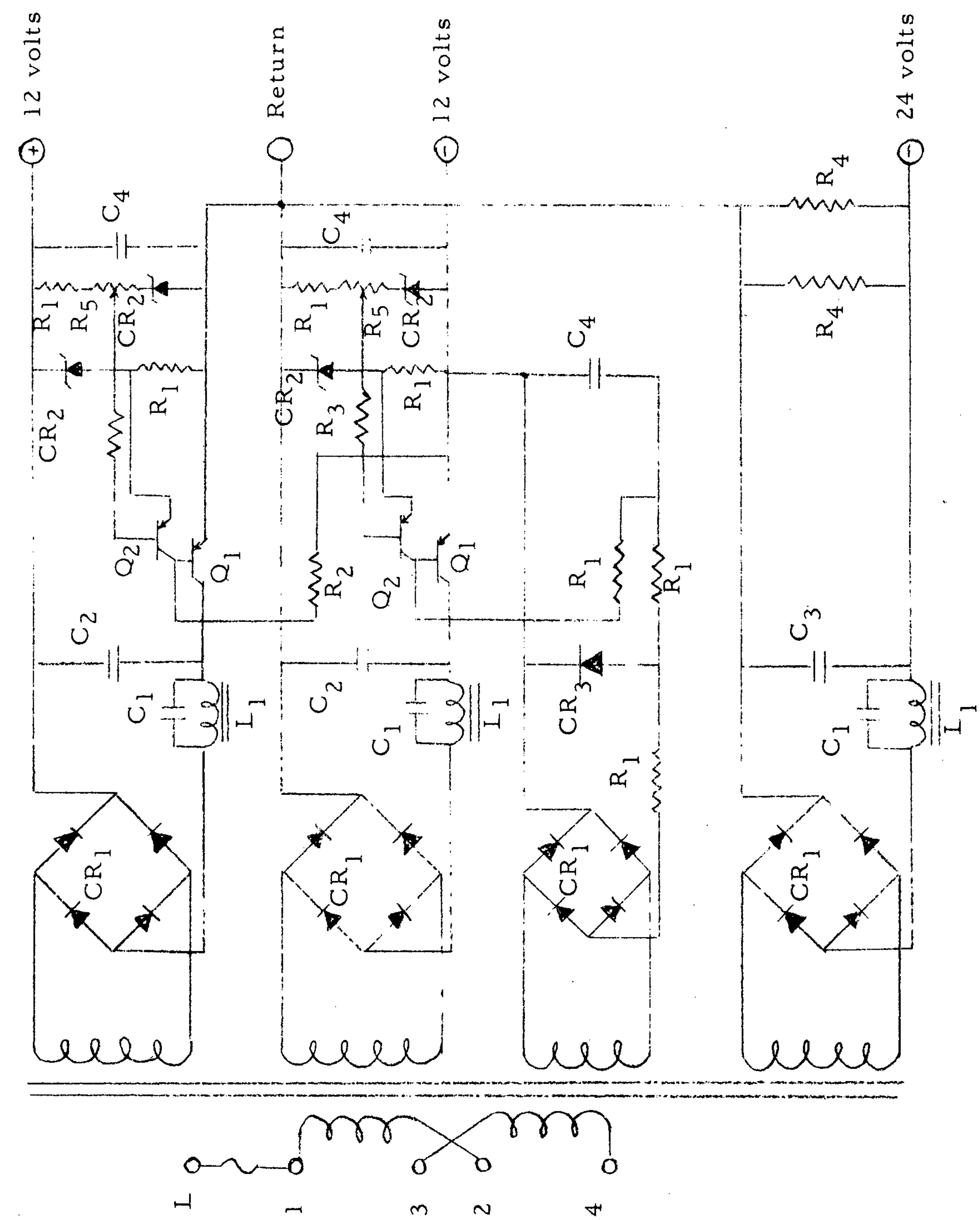
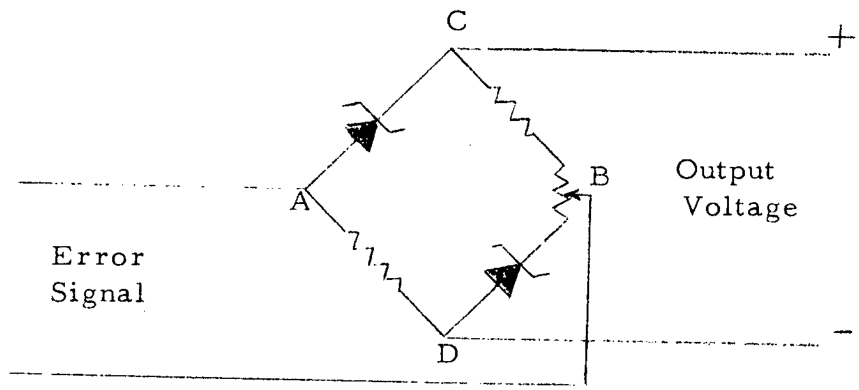


FIGURE 6.2 Power Supply, Schematic

two zener diodes and a potentiometer, as shown below:



The output voltage is applied across the arms CAD and CBD to generate an error signal. The potential of point A with respect to D is the output voltage minus the fixed zener voltage. This potential varies considerably with changes in output voltage. The potential of point B with respect to D is approximately equal to the fixed zener voltage and is fairly constant. Therefore, the error signal, which is the difference of potential between points A and B, will vary directly with output voltage. If the output voltage increases, the error signal will increase, and vice versa.

The error signal is fed to a transistor amplifier which drives the series regulating transistor. In order to operate properly, the series regulating transistor base must be biased negatively with respect to the emitter. This bias is obtained from the -12 volt supply for the +12 volt regulator, and from a separate bias supply for the -12 volt regulator. When the output voltage increases, the error signal changes so that the base current at the series regulating transistor decreases. When the base current decreases, the collector current decreases and the voltage across the transistor increases. This decreases the output voltage and compensates for the original rise in output voltage.

The third output (not used) is unregulated and consists of a bridge rectifier and filter section to provide a low dc ripple voltage.

The primary of the power transformer is made up of two sections, which are wired in parallel for 115-volt operation and in series for 230-volt operation. The fuse is properly rated for 230-volt operation, and is shorted when the system is operated on 115 volts. A 1/2 amp. circuit breaker mounted on the front panel of the receiver provides protection for 115-volt operation.

7.0 PARTS LISTS, RECEIVER

PARTS LIST

PL 100-1-04-000

SHEET 2 OF 2 SHEETS REV.

TITLE 100-1-04 RECEIVER (TOP ASSY)

Prepared 3-26-62

Approved

Approved

QUAN.	PART NUMBER	DESCRIPTION	CIRCUIT SYMBOL NO.	ITEM
1	100-1-04-074	TAPE PERFORATOR UNIT		1
1	100-1-04-073	RECEIVER CONTROL UNIT		2
1	100-1-04-070	CABLE (W1)		3
1	100-1-04-071	CABLE (W2)		4
1	100-1-04-072	CABLE (W3)		5
				6
REF.	100-1-04-034	SCHEMATIC DIAGRAM		7
REF.	100-1-04-075	TEST FIXTURE SCHEMATIC - TWO TONE MODULATOR		8
				9
REF.		ACI RECEIVER MANUAL		10
				11
REF.	100-1-10-022	TEST PROCEDURE		12
				13
				14
				15
				16

25X1 25X1 25X1

 100-1-04-000

Declassified in Part - Sanitized Copy Approved for Release 2012/10/16 : CIA-RDP78-03433A001100040001-6

PARTS LIST

PL 100-1-04-073

SHEET 2 OF 2 SHEETS REV.

TITLE RECEIVER CONTROL UNIT (TOP ASSY)

Prepared 3-26-62

Approved

Approved

QUAN.	PART NUMBER	DESCRIPTION	CIRCUIT SYMBOL NO.	ITEM
1	100-1-04-060	CABINET-REC. CONT. UNIT MODIFIED		1
1	100-1-04-056	RECEIVER CONT. UNIT (CHASSIS ASSY)		2
4	1112	SCREW-1032 x .750 LONG	H.A. SMITH BROOKLYN N.Y.	3
4	1117	WASHER, CUP-NO. 10		4
				5
REF	100-1-04-039	SCHEMATIC DIAGRAM		6
REF.	100-1-04-062	WIRING DIAGRAM		7
				8
				9
				10
				11
				12
				13
				14
				15
				16

25X1 25X1 25X1

100-1-04-073

SECRET

PARTS LIST

Prepared		3-26-62
Approved		
Approved		

PL 100-1-04-074

SHEET 3 OF 3 SHEETS REV.

TITLE TAPE PERFORATOR UNIT

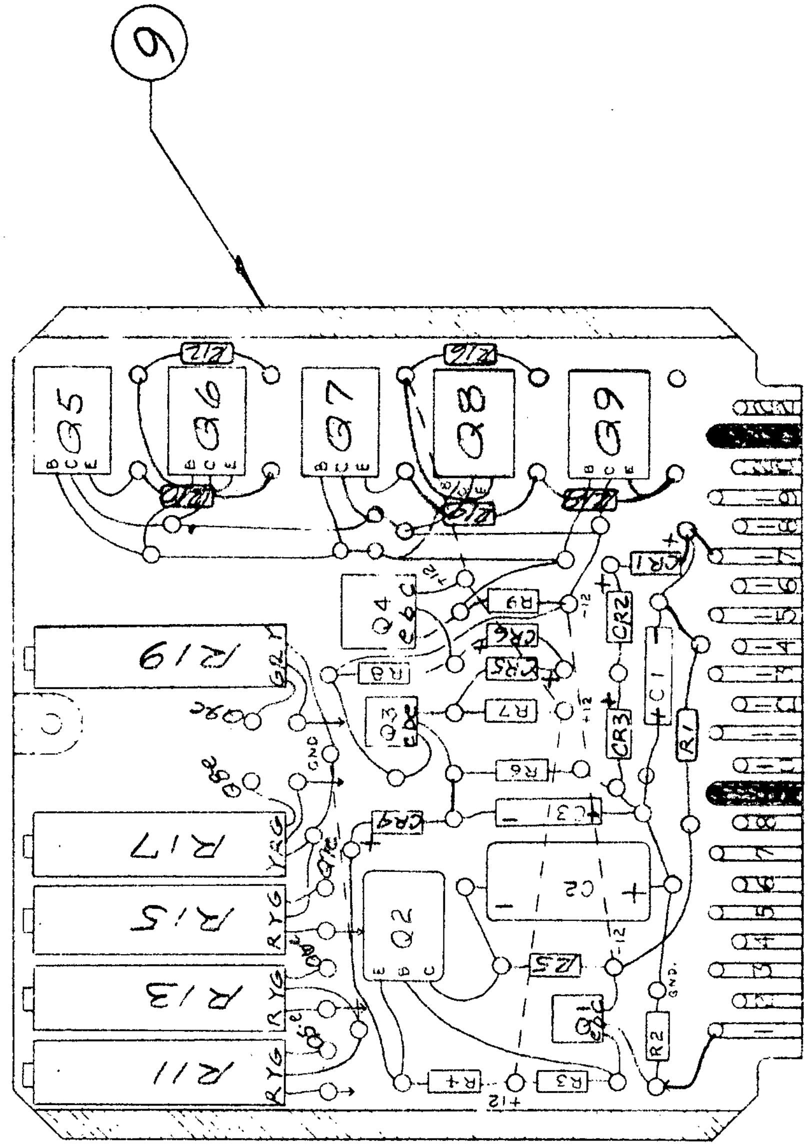
QUAN.	PART NUMBER	DESCRIPTION	CIRCUIT SYMBOL NO.	ITEM
1	100-1-04-066	TAPE PERFORATOR, MODIFIED		1
1	C-1552	CABINET- BUD RADIO CORP. CHICAGO, ILL.		2
4	1112	SCREW - 1032 X .750 LONG	H.A. SMITH, BROOKLYN, N.Y.	3
4	1117	WASHER, CUP - NO. 10		4
8	MS35208-41	SCREW PAN HD. - 832 X .437 LONG		5
REF	100-1-04-034	SCHEMATIC DIAGRAM		6
				7
1		TALLY MANUAL WITH LUBE KIT		8
				9
8	AN960-8L	WASHER, FLAT, - NO.8		10
8	MS20365-832A	NUT, LOCK - 8-32		11
				12
				13
				14
				15
				16

25X1 25X1 25X1

SECRET NOT RELEASABLE TO FOREIGN NATIONALS 100-1-04-074

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS



FOR SCHEMATIC DIAGRAM SEE 100-1-04-034

100-1-04-017

REV.

SHEET 1 OF 2 SHEETS

TITLE AGC CARD NO. 1 - RECEIVER

N.A.

100-1-04-053

Date 1-28-61

Prepared NWG

Approved

Approved

25X1

25X1

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

PARTS LIST

[redacted]

Prepared	[redacted]	11-28-61
Approved		
Approved		

PL 100-1-04-017

SHEET 2 OF 2 SHEETS REV.

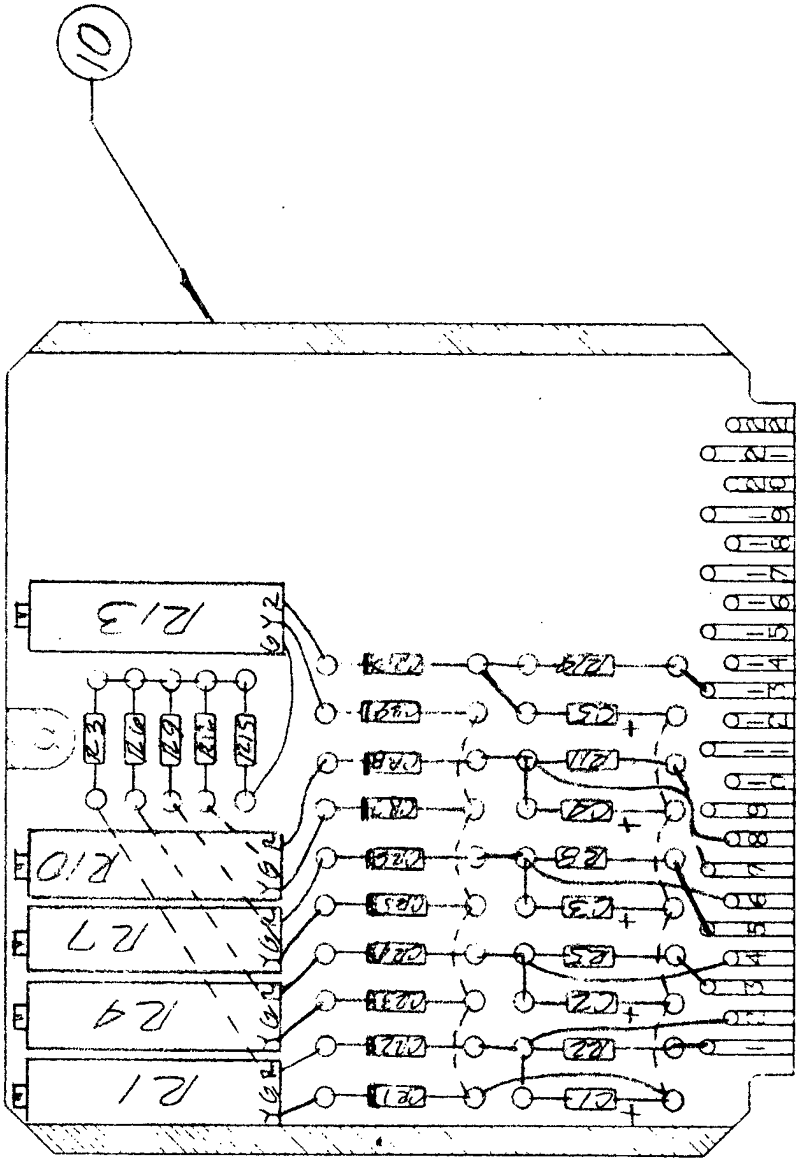
TITLE AGC CARD NO. 1 - RECEIVER

QUAN.	PART NUMBER	DESCRIPTION	CIRCUIT SYMBOL NO.	ITEM
2	RC07GF562K	RESISTOR MIL-R-11, 5.6K, 1/4 W	R1, R3	1
1	393 K	39 K	R2	2
1	222 K	2.2K	R4	3
1	101 K	100	R5	4
1	333K	33K	R6	5
1	RC07GF682 K	6.8K	R7	6
1	RC07GF103 K	10K 1/4 W	R8	7
6	RC20GF102K	RESISTOR MIL-R-11, 1K, 1/2 W	R9, R10, R12 R14, R16, R18	8
1	100-1-04-010	CARD		9
1	2N706	TRANSISTOR -	Q4	10
5	236L-1-102	POT. - 1K 0.8W BOURNS, RIVERSIDE, CALIF.	R11, R13, R15 R17, R19	11
2	SCM226BP015D4	CAPACITOR-TANT, 22µF, 15V, TEXAS INST DALLAS TEX	C1, C3	12
1	SCM107HP020D4	CAPACITOR-TANT, 100µF, 20V, TEXAS INST DALLAS TEX	C2	13
6	IN270	DIODE-Ge HUGHES PRODUCTS NEWPORT BEACH, CALIF	CR1, CR2, CR3 CR4, CR5, CR6	14
6	2N1038	TRANSISTOR-Ge, PNP - TEXAS INST., DALLAS, TEX	Q2, Q5, Q6 Q7, Q8, Q9	15
2	2N861	TRANSISTOR - Si PNP - PHILCO, LANSDALE, PENN.	Q1, Q3	16
REF	100-1-09-03	SCHEMATIC DIAGRAM		17

25X1 25X1 25X1

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS



FOR SCHEMATIC DIAGRAM SEE 100-1-04-034

100-1-04-019	REV.
SHEET 1 OF 2 SHEETS	
TITLE	AGC CARD NO. 2 - RECEIVER
	N.A.
	100-1-04-053
Date	1/23/61
Prepared	
Approved	
Approved	

25X1

25X1

25X1

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

PARTS LIST

[redacted]

PL 100-1-04-019 — SHEET 2 OF 2 SHEETS — REV. A

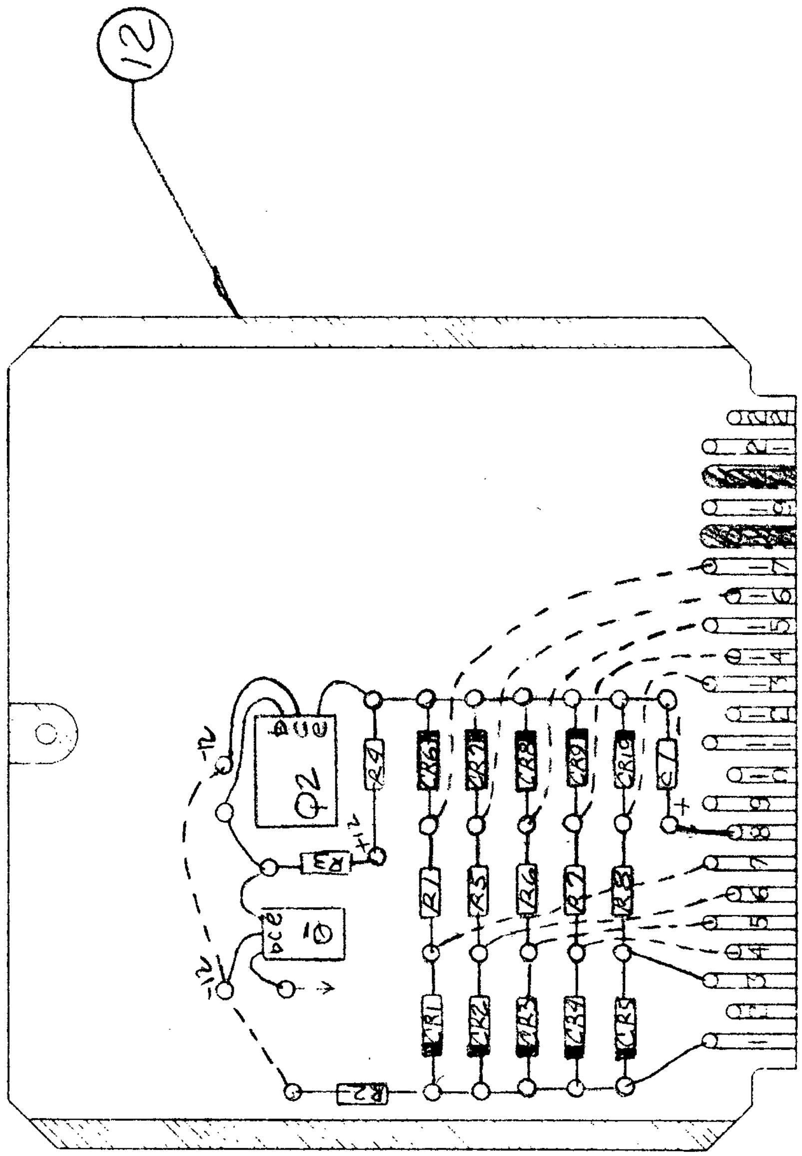
TITLE: AGC CARD NO. 2 - RECEIVER

Prepared	[redacted]	11-29-61
Approved		
Approved		

QUAN.	PART NUMBER	DESCRIPTION	CIRCUIT SYMBOL NO.	ITEM
5	RC07GF102K	RESISTOR-MIL-R-11, 1K, 1/4 W	R2, R5, R8, R11, R14	1
5	RC07GF332K	RESISTOR-MIL-R-11, 3.3K 1/4 W	R3, R6, R9, R12, R15	2
				3
5	236L-1-102	POT-1K, 0.8W, BOURNS, RIVERSIDE, CALIF.	R1, R4, R7, R10, R13	4
				5
5	SCM334FP035A4	CAPACITOR-TANT, .33UF, 35V. TEXAS INST DALLAS, TEX	C1, C2, C3, C4, C5,	6
				7
10	1N270	DIODE- HUGHES PRODUCTS, NEWPORT BEACH, CAL.	CR1 THRU CR10	8
				9
1	100-1-04-015	AGC CARD № 2		10
				11
REF.	100-1-04-034	SCHEMATIC DIAGRAM		12
				13
				14
				15
				16

25X1 25X1 25X1

NOT RELEASABLE TO FOREIGN NATIONALS



SEE SCHEMATIC DIAGRAM, 100-1-04-034

25X1

25X1

25X1

100-1-04-020

REV. A

SHEET 1 OF 2 SHEETS

TITLE Logic Card Receiver

N.A.

100-1-04-053

Date 1-2-61

Prepared

Approved

Approved

NOT RELEASABLE TO FOREIGN NATIONALS

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

PARTS LIST

PL 100-1-04-020 | REV. A

SHEET 2 OF 2 SHEETS

TITLE: LOGIC CARD - RECEIVER

Prepared	25X1	11-28-61
Approved		
Approved		

QUAN.	PART NUMBER	DESCRIPTION	CIRCUIT SYMBOL NO.	ITEM
5	RC07GF103K	RESISTOR, MIL-R-11 - 10K, 1/4 W	R1, R5, R6, R7, R8	1
1	RC07GF223K	22K, 1/4 W	R2	2
1	RC07GF682K	6.8K, 1/4 W	R3	3
1	RC07GF821K	RESISTOR, MIL-R-11 - 820Ω, 1/4 W	R4	4
				5
1	SCM105FP020A4	CAPACITOR, TANT. 1.0uF, 20V, TEXAS INST., DALLAS, TEX.	C1	6
				7
10	1N270	DIODE, Ge - HUGHES PROD. NEWPORT BEACH, CALIF.	CR1 THRU CR10	8
1	2N224	TRANSISTOR, Ge - PHILCO, LANSDALE, PENN.	Q1	9
1	2N1038	TRANSISTOR, Ge - TEXAS INST., DALLAS, TEX.	Q2	10
				11
1	100-1-04-014	CARD		12
REF	100-1-04-034	SCHEMATIC DIAGRAM		13
				14
				15
				16

25X1 25X1 25X1

SECRET NOT RELEASABLE TO FOREIGN NATIONALS

NOT RELEASABLE TO FOREIGN NATIONALS

100-1-04-021

REV. B

SHEET 1 OF 3 SHEETS

TITLE AUDIO CARD NO 1 - RECEIVER

N.A.

100-1-04-053

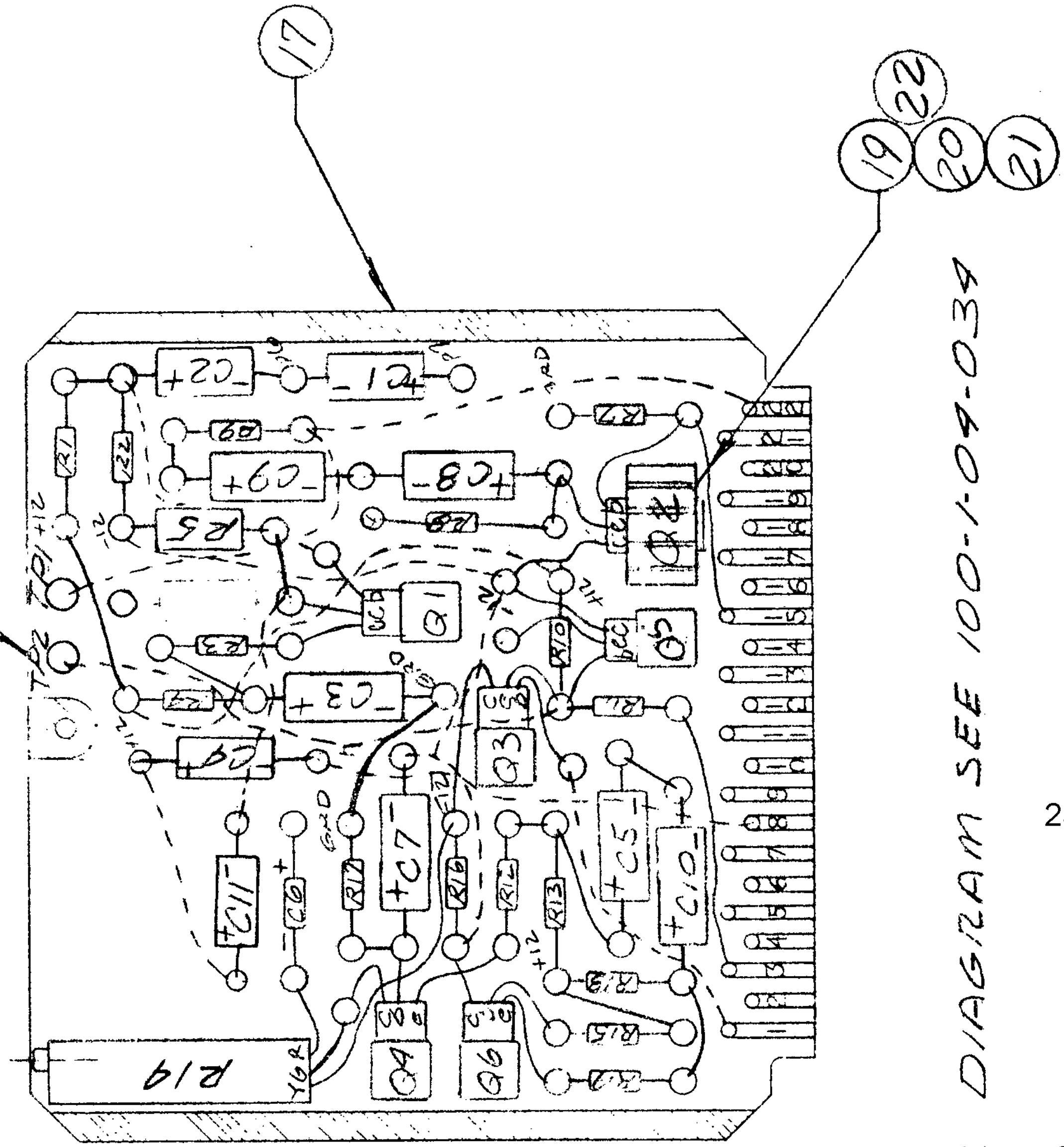
Date 1-16-62

Prepared

Approved

Approved

RUBBER STAMP MARKINGS AS SHOWN



FOR SCHEMATIC DIAGRAM SEE 100-1-04-034

25X1

25X1

25X1

NOT RELEASABLE TO FOREIGN NATIONALS

PARTS LIST

PL 100-1-04-021 B

SHEET 2 OF 3 SHEETS REV.

TITLE AUDIO CARD NO. 1 - RECEIVER

Prepared [redacted] 11-28-61

Approved

Approved

QUAN.	PART NUMBER	DESCRIPTION	CIRCUIT SYMBOL NO.	ITEM
1	RC32GF561K	RESISTOR, MIL-R-11, 560Ω, 1W	R8	1
1	RC07GF101K	100Ω, 1/4 W	R4	2
1	RC07GF221K	220Ω, 1/4 W	R12	3
1	RC32GF561K	560Ω, 1 W	R5	4
1	RC07GF331K	330Ω, 1/4 W	R9	5
1	RC07GF152K	RESISTOR, MIL-R-11, 1.5K, 1/4 W	R1	6
1	RC07GF102K	RESISTOR, MIL-R-11, 1K, 1/4 W	R7	7
2	SCM685BP020D4	CAPACITOR-TANT, 6.8uf, 20V - TEXAS INST DALLAS, TEX	C1, C2	8
				9
1	SCM335BP020D4	CAPACITOR-TANT, 3.3uf, 20V - TEXAS INST. DALLAS, TEX.	C7	10
4	2N224	TRANSISTOR, Ge, PNP PHILCO. LANSDALE, PENN.	Q3, Q4, Q5, Q6	11
2	2N1038	TRANSISTOR, Ge, PNP TEXAS INST. DALLAS, TEX	Q1, Q2	12
1	236S-1-103	POT.-10K 0.8W BOURNS. RIVERSIDE, CALIF.	R14	13
1	RC07GF153K	RESISTOR, MIL-R-11, 15K, 1/4 W	R13	14
2	RC07GF682K	RESISTOR, MIL-R-11, 6.8K, 1/4 W	R15, R2	15
1	RC07GF471K	RESISTOR, MIL-R-11, 470Ω, 1/4 W	R11	16

25X1 25X1 25X1

SECRET

PARTS LIST

[redacted]

Prepared	[redacted]	11-28-61
Approved		
Approved		

PL 100-1-04-021   REV. B

SHEET 3 OF 3 SHEETS

TITLE AUDIO CARD NO. 1, RECEIVER

QUAN.	PART NUMBER	DESCRIPTION	CIRCUIT SYMBOL NO.	ITEM
1	100-1-04-012	CARD		17
REF	100-1-04-034	SCHEMATIC DIAGRAM		18
1	3AL6802R	TRANSISTOR HEAT RAD.- THE BIRCHER CORP., L.A. CALIF.		19
1	MS35208-"X"	SCREW, PAN HD. - 440 X .187LONG		20
1	NAS620-4L	WASHER, FLAT, NO. 4		21
1	MS35337-21	WASHER SPRING LOCK, NO. 4		22
				23
1	RC07GF392K	RESISTOR, MIL-R-11- 3.9K, 1/4W	R10	24
1	RC07GF562K	-5.6K, 1/4W	R16	25
1	RC07GF332K	-3.3K, 1/4W	R17	26
1	RC07GF123K	-12 K, 1/4W	R18	27
2	RC07GF470K	RESISTOR, MIL-R-11-47Ω, 1/4W	R19, R3	28
2	SCM476GP020D4	CAPACITOR, TANT. - 47μf, 20V- TEXAS INST DALLAS, TEX.	C8, C9	29
1	SCM105FP020D4	CAPACITOR, TANT - 1μf, 20V- TEXAS INST, DALLAS, TEX.	C6	30
2	SCM336GP020D4	CAPACITOR, TANT-33μf, 20V- TEXAS INST DALLAS TEX	C3, C5	31
3	SCM226GP020D4	CAPACITOR, TANT- 22μf, 20V- TEXAS INST DALLAS TEX	C10, C4, C11	32

25X1 25X1 25X1

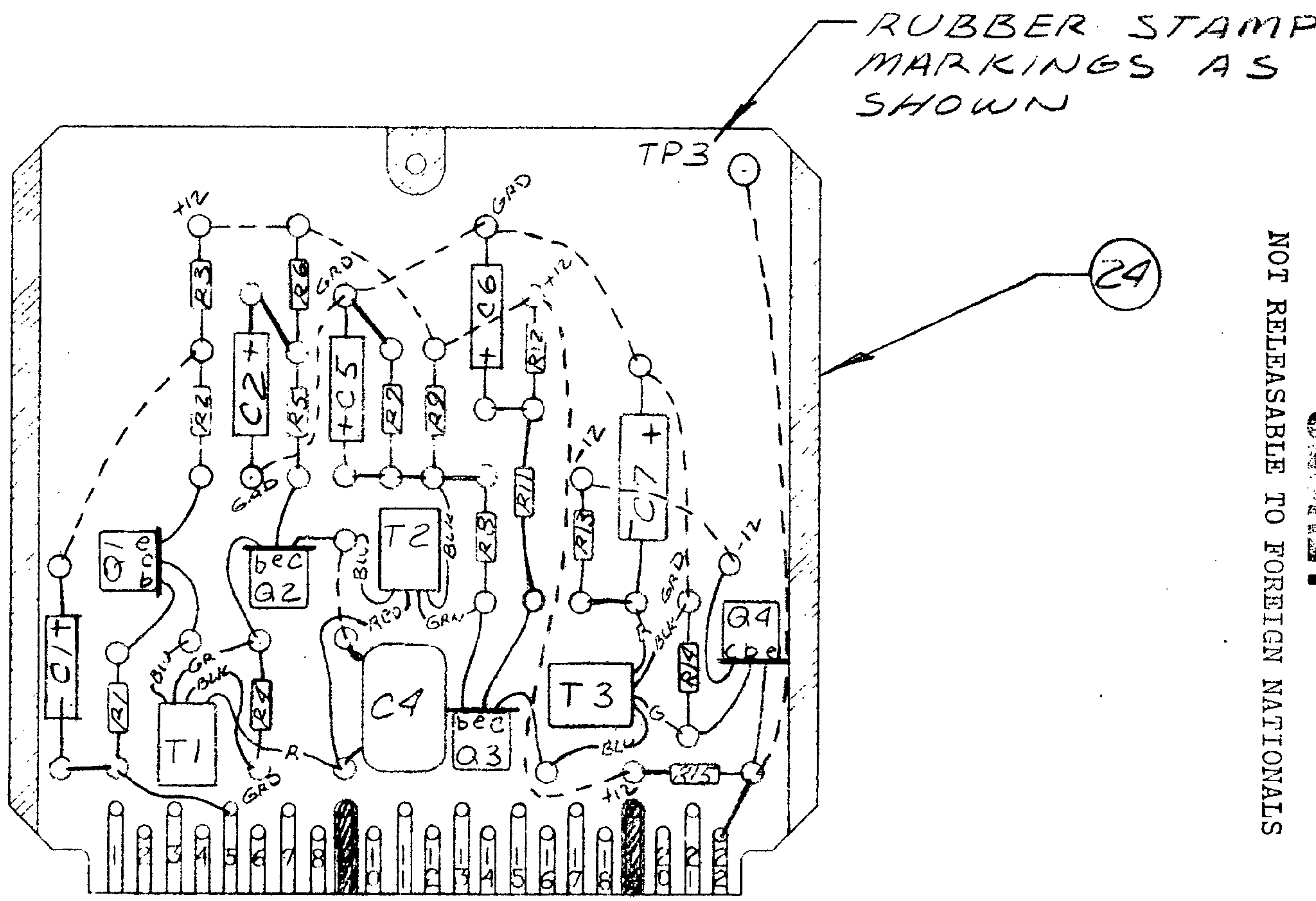
SECRET

Declassified in Part - Sanitized Copy Approved for Release 2012/10/16 : CIA-RDP78-03433A001100040001-6

			100-1-04-022	C
			SHEET 1 OF 3 SHEETS	REV.
Prepared		Date 11-27-6	N.A.	TITLE AUDIO CARD NO. 2 - RECEIVER
Approved			100-1-04-053	
Approved				

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS



FOR SCHEMATIC DIAGRAM SEE 100-1-04-034

25X1

25X1

25X1

SECRET NOT RELEASABLE TO FOREIGN NATIONALS

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

PARTS LIST

PL 100-1-04-022 REV. C

SHEET 2 OF 3 SHEETS

TITLE AUDIO CARD NO. 2 - RECEIVER

Prepared 11-28-61
Approved
Approved

QUAN.	PART NUMBER	DESCRIPTION	CIRCUIT SYMBOL NO.	ITEM
2	RC07GF820K	RESISTOR, MIL-R-11, 82Ω, 1/4 W	R2, R5	1
2	561 K	560, 1/4 W	R4, R8	2
2	273 K	27K, 1/4 W	R3, R6	3
1	101 K	100Ω, 1/4 W	R13	4
1	182 K	1.8 K, 1/4 W	R7	5
1	472 K	4.7K, 1/4 W	R9	6
2	102 K	1 K, 1/4 W	R11, R1	7
1	682 K	6.8K, 1/4 W	R12	8
1	103 K	10K, 1/4 W	R14	9
1	RC07GF 562 K	RESISTOR, MIL-R-11, 5.6K, 1/4 W	R15	10
				11
				12
2	SCM226GP020A4	CAPACITOR, TANT, 22 µf, 20V - TEXAS INST DALLAS, TEX	C1, C2	13
2	SCM475BP020A4	, 4.7 µf, 20V - TEXAS INST DALLAS, TEX	C5, C6	14
1	SCM336GP020A4	CAPACITOR, TANT, 33 µf, 20V - TEXAS INST. DALLAS, TEX.	C7	15
1	DM2U-472 J	CAPACITOR, ELMENCO 4700 µµf, 5% - ARCO GREAT NECK, N.Y.	C4	16

25X1 25X1 25X1

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

PARTS LIST

[redacted]

PL 100-1-04-022 C

SHEET 3 OF 7 SHEETS REV.

TITLE AUDIO CARD NO. 2 - RECEIVER

Prepared	[redacted]	11-27-61
Approved		
Approved		

QUAN.	PART NUMBER	DESCRIPTION	CIRCUIT SYMBOL NO.	ITEM
2	DO-T9	TRANSFORMER, 10K:600 - UTC NEW YORK, N.Y.	T1, T2	17
1	DO-T36	TRANSFORMER, 10K:10K - UTC NEW YORK, N.Y.	T3	18
				19
4	2N224	TRANSISTOR, Ge, PNP, - PHILCO. LANSDALE, PENN.	Q1, Q2, Q3, Q4	20
				21
~~1~~	~~37A1~~	~~THERMISTOR, 7K - VICTORY ENG CO. UNION, N.J.~~	~~RT1~~	22
REF	100-1-04-039	SCHEMATIC DIAGRAM		23
1	100-1-04-016	CARD		24
				25
				26
				27
				28
				29
				30
				31
				32

25X1

25X1

25X1

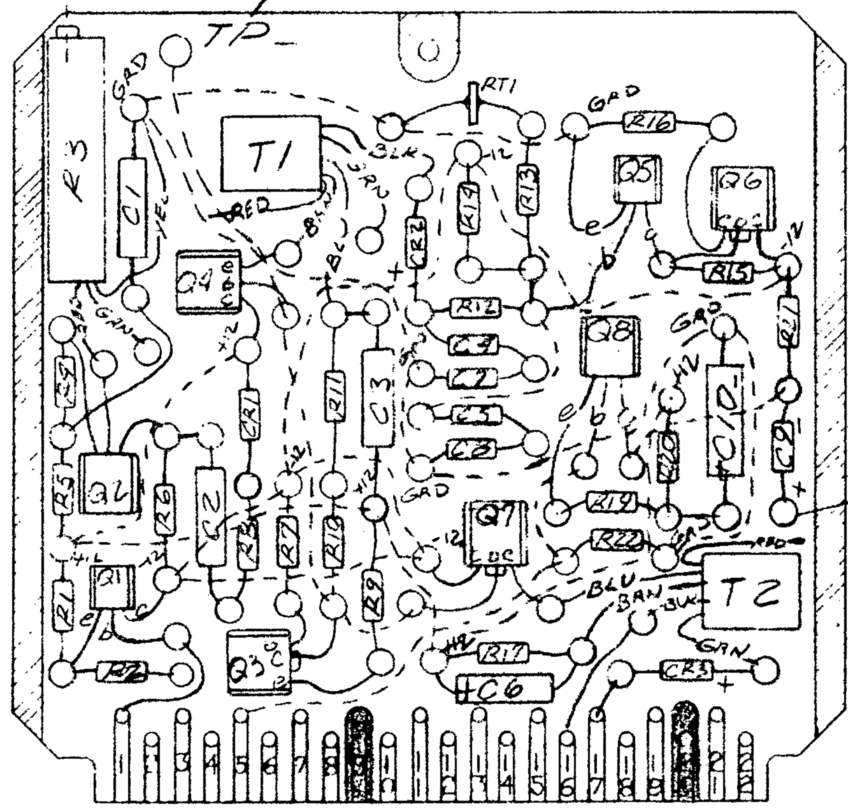
Prepared		Date 12-15-61	N.A. 100-1-04-053
Approved			
Approved			

100-1-04-023 — REV. C

SHEET 1 OF 5 SHEETS

TITLE DETECTOR CARD-RECEIVER

RUBBER STAMP MARKINGS AS SHOWN



TO R3 GRN

NOTE:-
-1 HAS TP4
-2 " TP5
-3 " TP6
-4 " TP7
-5 " TP8

3. FOR SCHEMATIC DIAGRAM SEE 100-1-04-034

2 THERE ARE 5 DIFF. CONFIGURATIONS OF THIS BOARD SEE ITEMS 49 THRU 53

1 ONE EA. OF THESE PER DASH NO.

NOTES: UNLESS OTHERWISE SPECIFIED-

25X1

25X1

25X1

PARTS LIST

[redacted]

PL 100-1-04-023 REV. C

SHEET 2 OF 5 SHEETS

TITLE DETECTOR CARD-RECEIVER

Prepared	[redacted]	11-23-61
Approved		
Approved		

	QUAN.	PART NUMBER	DESCRIPTION		CIRCUIT SYMBOL NO.	ITEM
1	1	RC07GF222K	RESISTOR MIL-R-11, 2.2K, 1/4W		R1	1
	1	471K	470		R2	2
	1	101K	100Ω		R4	3
	4	272K	2.7K		R5, R11, R18, R17	4
	1	122K	1.2K		R6	5
	1	183K	18K		R7	6
	1	152K	1.5K		R3	7
	1	681K	680		R9	8
	1	332K	3.3K		R10	9
	2	123K	12K		R13, R20	10
	1	104K	100K		R14	11
	1	103K	10K		R15	12
	1	RC07GF682K	RESISTOR MIL-R-11 6.8K, 1/4W		R16	13
	2	SCM685BP020A4	CAPACITOR-TANT, 6.8 uF 20V	TEXAS INST. DALLAS TEX	C3, C6	14
	3	SCM105FP020A4	CAPACITOR-TANT 1.0uF 20V	TEXAS INST DALLAS TEX	C2, C5, C8	15
1	2	SCM474FP035A4	CAPACITOR-TANT .47uF 35V	TEXAS INST DALLAS TEX	C4, C7	16

25X1 25X1 25X1

PARTS LIST

PL 100-1-04-023 | SHEET 3 OF 5 SHEETS | REV. C

TITLE: DETECTOR CARD-RECEIVER

Prepared [redacted] 1-23-61
Approved
Approved

QUAN.		PART NUMBER	DESCRIPTION		CIRCUIT SYMBOL NO.	ITEM
1	3	1N270	DIODE - Ge	HUGHES PRODUCTS NEWPORT BEACH CAL	CR1, CR2 CR3	17
	2	2N224	TRANSISTOR - Ge, PNP	PHILCO LANSDALE, PA	Q2, Q8	18
	3	2N404	TRANSISTOR - Ge, PNP	R.C.A. SOMERVILLE N.J.	Q3, Q6 Q7	19
	1	2N1304	TRANSISTOR - Ge, NPN	TEXAS INST. DALLAS TEX.	Q4	20
	2	2N301	TRANSISTOR - Ge, PNP	PHILCO LANSDALE, PA.	Q1, Q5	21
	2	DO-T20	TRANSFORMER - 500 : 600	U.T.C. NEW YORK N.Y.	T1, T2	22
	1	236L-1-102	POTENTIOMETER, .3W 1K BOURNS	RIVERSIDE CALIF.	R3	23
1	1	31D4	THERMISTOR -	VICTORY ENG CORP. UNION, N. J.	RT1	24
	1	100-1-04-013-1	DETECTOR CARD HARDWARE DWG.			25
	1	-013-2	" " " "			26
	1	-013-3	" " " "			27
	1	-013-4	" " " "			28
	1	-013-5	" " " "			29
						30
						31
						32

25X1 25X1 25X1

Declassified in Part - Sanitized Copy Approved for Release 2012/10/16 : CIA-RDP78-03433A001100040001-6

PARTS LIST

[redacted]

Prepared	[redacted]	1-3-62
Approved		
Approved		

PL 100-1-04-023 C

SHEET 4 OF 5 SHEETS REV.

TITLE DETECTOR CARD-RECEIVER

QUAN.		PART NUMBER	DESCRIPTION	CIRCUIT SYMBOL NO.	ITEM
1	1	SCM105FP035D4	CAPACITOR, TANT-1μF 35V	C9	33
	2	SCM106BP020D4	" " -10μF 20V-	C10, C1	34
					35
					36
	1	RC07GF562K	RESISTOR, MIL-R-11, 5.6K, 1/4W	R21	37
	1	RC07GF151K	RESISTOR, MIL-R-11, 150Ω, 1/4W	R19	38
1	1	RC07GF102K	RESISTOR, MIL-R-11, 1K, 1/4W	R22	39
					40
	REF.	100-1-04-034	SCHEMATIC DIAGRAM		41
					42
					43
					44
					45
					46
					47
					48

25X1 25X1 25X1

PL 100-1-04-023 — SHEET 5 OF 5 SHEETS — REV. C

TITLE DETECTOR CARD-RECEIVER

Prepared	[redacted]	12-23-61
Approved		
Approved		

QUAN.	PART NUMBER	DESCRIPTION	CIRCUIT SYMBOL NO.	ITEM
	100-1-04-023-1	INCLUDES ITEM 1 THR 24, ITEMS 33 THRU 39 PLUS ITEM 25		49
	-023-2	INCLUDES ITEM 1 THRU 24, ITEMS 33 THRU 39 PLUS ITEM 26		50
	-023-3	INCLUDES ITEM 1 THRU 24, ITEMS 33 THRU 39 PLUS ITEM 27		51
	-023-4	INCLUDES ITEM 1 THRU 24, ITEMS 33 THRU 39 PLUS ITEM 28		52
	100-1-04-023-5	INCLUDES ITEM 1 THRU 24 ITEMS, 33 THRU 39 PLUS ITEM 29		53
				54
				55

25X1

25X1

25X1

FIGURE 8.1
RECEIVER, TOP VIEW

Declassified in Part - Sanitized Copy Approved for Release 2012/10/16 : CIA-RDP78-03433A001100040001-6

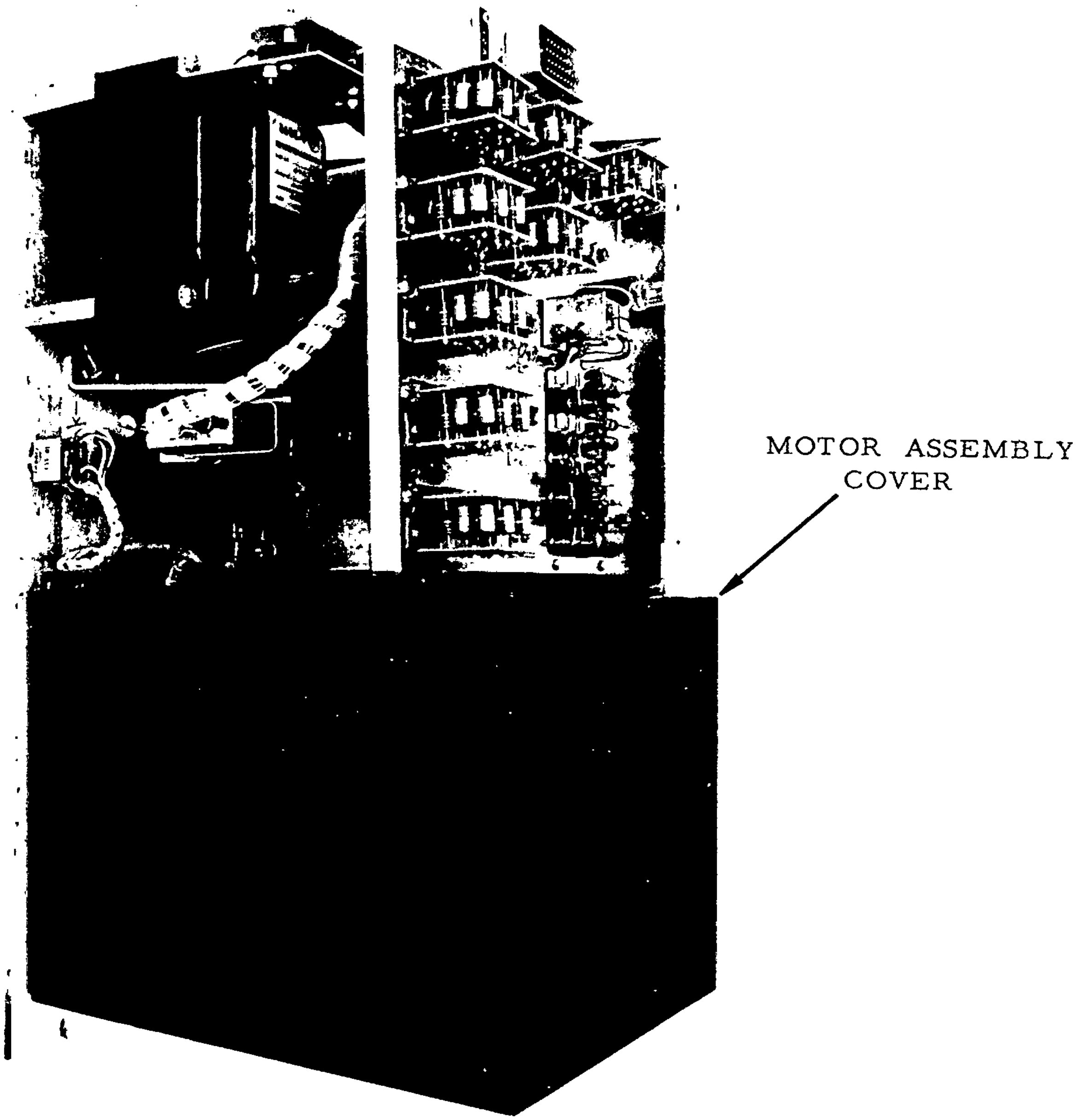


FIGURE 8.2
PERFORATOR, TOP VIEW

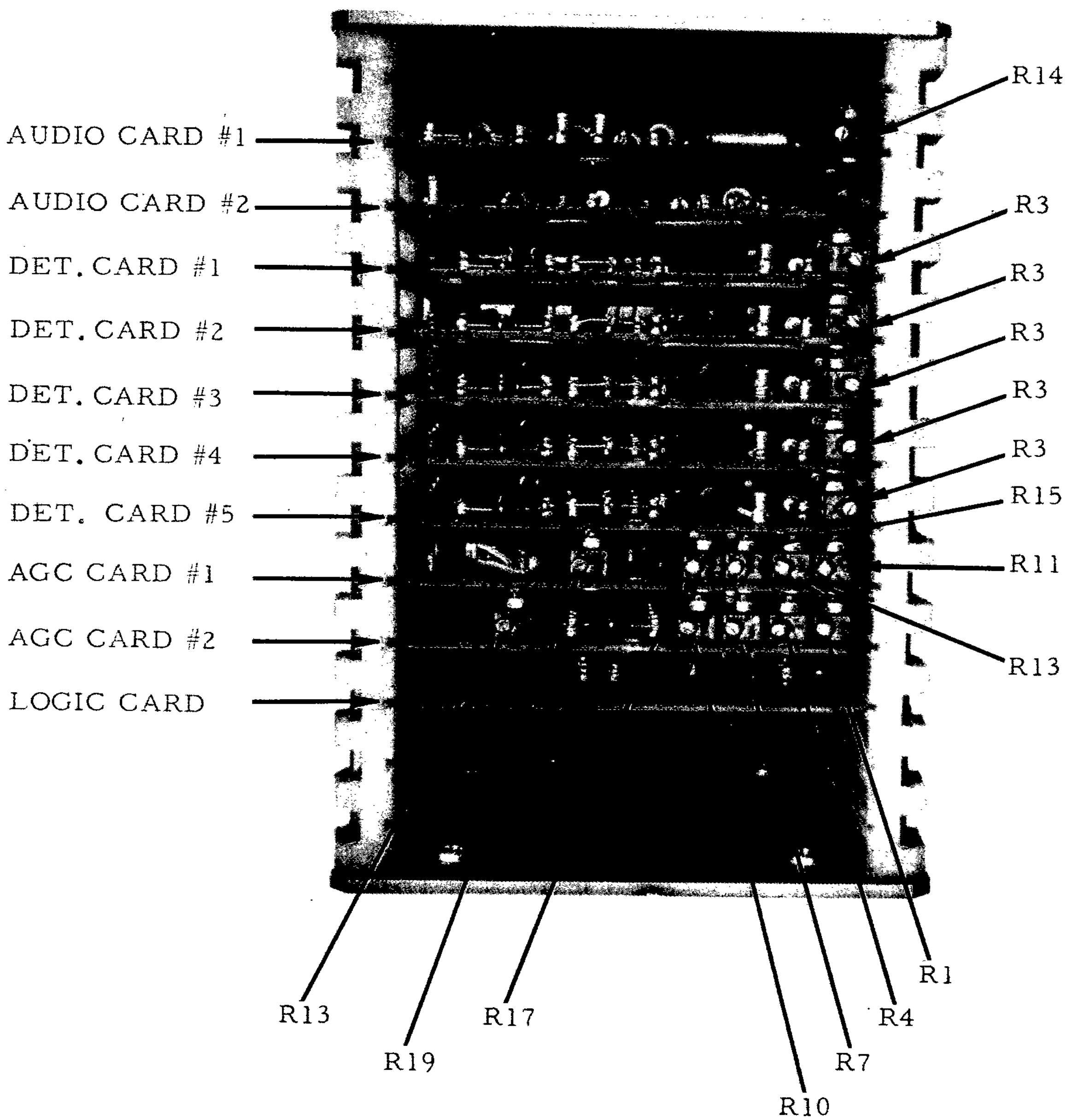


FIGURE 8.3
CARD ASSEMBLY

9.0 SPECIFICATIONS, RECEIVER

FL 103C Band Pass Filter

FL 105D Band Reject Filter

FL 106B Band Pass Filter

100-1-10-019C Tally Perforator and Drive Assembly Specification

100-1-10-006C Power Supply

SECRET NOT RELEASABLE TO FOREIGN NATIONALS

1.0 Classification: Filter, audio

2.0 Type: Band pass

3.0 Electrical Characteristics

3.1 Center Frequency:

Part No.	Freq. cps
FL 103-1	1400
FL 103-2	1500
FL 103-3	1600
FL 103-4	1700
FL 103-5	1800

3.2 3 db bandwidth: 100 cps $^{+0\text{ cps}}_{-15\text{ cps}}$

3.3 30 db bandwidth: 165 cps. maximum

3.4 Passband Symmetry: Arithmetic mean of 3 db points and 30 db points within $\pm$ 5 cps of center frequency

3.5 Ripple in pass band: $\pm$ 1/2 db maximum

3.6 Input/output impedance

3.6.1 Pass band: 600 ohms

3.6.2 Outside passband: Greater than 600 ohms

3.7 Input power: -40 to +10 dbm

3.8 Insertion Loss: 6 db maximum

3.9 Maximum d. c. working voltage: 200

25X1

4.0 Mechanical characteristics

4.1 Case size: GB per MIL-T-27A except height not to exceed 5 in.

4.2 Terminals: Solder lug

4.3 Marking: Each item marked FL-103-___ and serial number (No other markings)

25X1

Rev. C: 3/19/62 Changed marking, added passband symmetry (3.4)

Rev. B: 1/10/62 Changed 30 db bandwidth; modified marking requirements

Rev. A: 11/17/61 added tolerance on 3 db bandwidth; case size modified

25X1

SECRET

FL 103	REV. C
SHEET 1 OF 1 SHEETS	
TITLE	FILTER, BAND PASS
Prepared	Date 9-26-61
Approved	9-26-61
Approved	

FL-103 C

NOT RELEASABLE TO FOREIGN NATIONALS

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

1.0 Classification: Filter, audio

2.0 Type: Band Reject

3.0 Electrical Characteristics

3.1 Relative Attenuation

3.1.1 3 db or less at 1250 and 1950 cps

3.1.2 30 db or more at 1300 and 1900 cps

3.1.3 No returns above -50 db between 1300 and 1900 cps

3.2 Input/Output Impedance: 600 ohms

3.3 Insertion Loss: 6 db max.

3.4 Input power: -50 to 0 dbm

3.5 Maximum D.C. Working Voltage: 100

3.6 Ripple in Passband: ± 1.5 db max.

4.0 Mechanical Characteristics

4.1 Case Size: See sheet 3

4.2 Terminals: Solder lug

4.3 Marking: Each item shall be marked FL-105 and serial number (No other markings)

25X1

Rev. D: 3/19/62 changed marking

25X1

Rev. C: Changed can dims & Redrew Sht. 3.

Rev. B: Changed insertion loss; added ripple requirement 11/17/61

Rev. Note: FL-105 was FL-102, added sheet 3, case size (10-12-61, S.B.)

D REV.

FL 105 SHEET 1 OF 3 SHEETS

TITLE FILTER, BAND REJECT

Date 9-21-61

9-21-61

Prepared

Approved

Approved

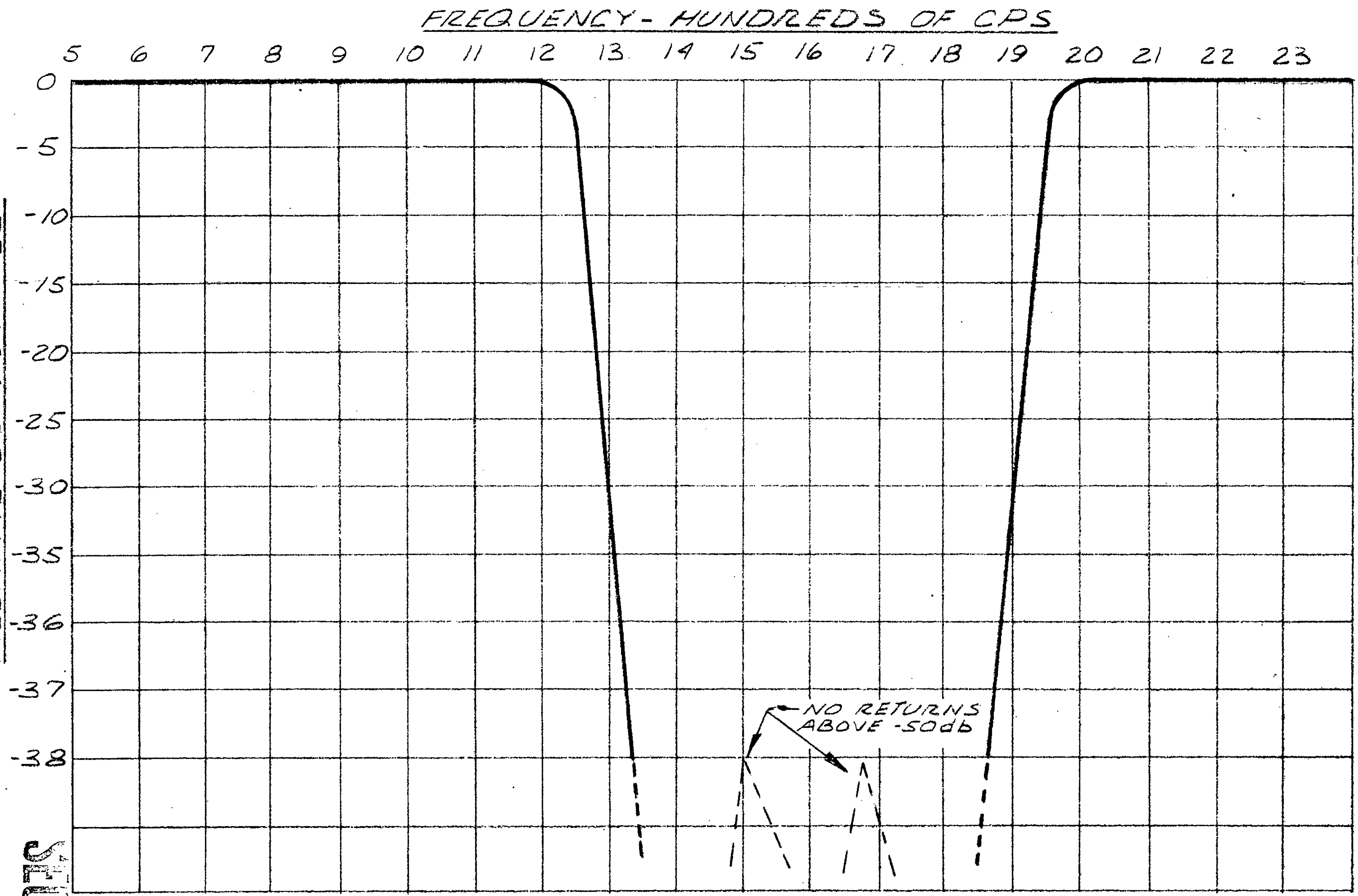
SECRET

25X1

FL-105 D

NOT RELEASABLE TO FOREIGN NATIONALS

Declassified in Part - Sanitized Copy Approved for Release 2012/10/16 : CIA-RDP78-03433A001100040001-6



FL-105 OUTPUT CHARACTERISTICS

REV. D
SHT. 2 OF 3
9-23-61

FL105

D

SHEET 3 OF 3 SHEETS

REV.

TITLE

BAND REJECT FILTER

Prepared

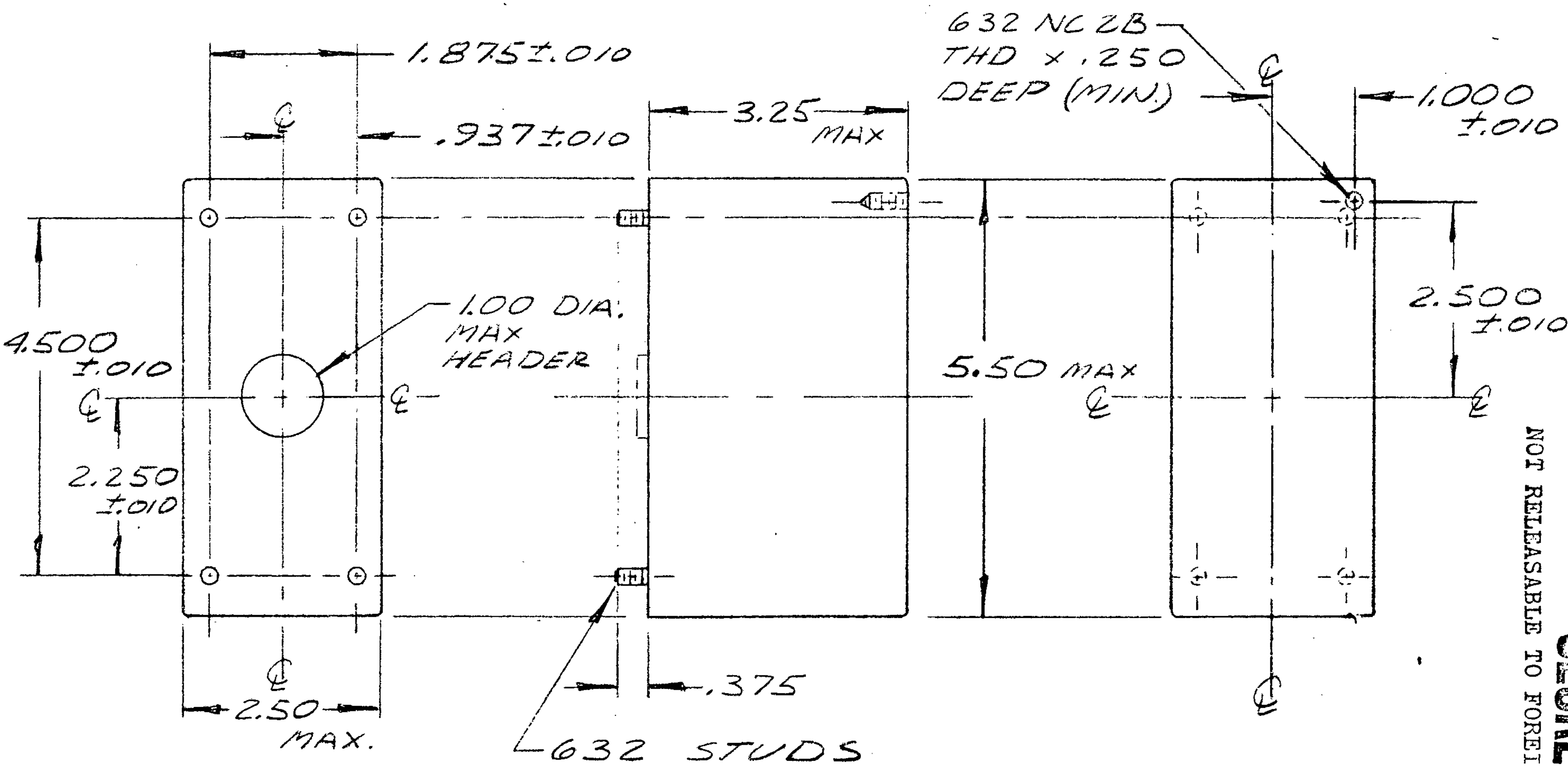
REDRAWN

~~Approved~~

Approved

Date 1-31-62

3-1-62



25X1

25X1

25X1

SECRET NOT RELEASABLE TO FOREIGN NATIONALS

FL 105

NOT RELEASABLE TO FOREIGN NATIONALS

SECRET

Declassified in Part - Sanitized Copy Approved for Release 2012/10/16 : CIA-RDP78-03433A001100040001-6

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

1.0 Classification: Filter, Audio

2.0 Type: Band Pass

3.0 Electrical Characteristics

3.1 Relative Attenuation

3.1.1 3db or less at 1300 and 1900 cps

3.1.2 30 db or more at 1250 and 1950 cps

3.1.3 No returns above 50 db below 1250 and above 1950 cps

3.2 Input/Output Impedance: 600 ohms

3.3 Insertion Loss: 6 db max.

3.4 Input power: - 50 to +15 dbm

3.5 Maximum D.C. Working Voltage: 100

3.6 Ripple: ± 1 db in pass-band

4.0 Mechanical Characteristics

4.1 Case Size: See Sheet 3 of FL 105

4.2 Terminals: Solder lug

4.3 Marking: Each item shall be marked FL-106 and serial number (no other markings)

25X1

25X1

SECRET

NOT RELEASABLE TO FOREIGN NATIONALS

Rev. B: 3/19/62 Changed marking

Rev. A: 11/17/61 Changed insertion loss requirements

25X1

REV.	B
SHEET 1 OF 1 SHEETS	FL - 106
TITLE	FILTER, BAND PASS
Prepared	Date 10/17/61
Approved	10/18/61
Approved	

FL - 106 B

SECRET

REVISION NOTES FOR "A" CHANGE

1. ADDED SH 1 OF 3 THIS DWG.
2. ADDED .500 DIA. ON SH 2 OF 3
3. 90-126 VAC WAS 90-120 VAC SH 3 OF 3
4. DWG. NO. WAS 007-1-005
5. ADDED WINDOW ON CHAD BOX TOP

REVISION NOTES FOR "B" CHANGE

6. ADDED .281 DIA HOLES ON SH 2 OF 3.
7. ADDED APPROX. RELOCATION OF CONNECTORS ON SH 2 OF 3.

8. REMOVED 4 .281 DIA HOLES FROM SHT #2 & ADDED REF. TO ACI DWG 100-1-09-052 & 100-1-09-052

Sheet	Rev.	
3	A	NOTES.
2	B	DRAWING
1	B	INDEX & REVISION SHEET

Sheet Index

Prepared | Date 1-23-62
Approved | 1-23-62
Approved | 1-23-62

TITLE: TALLY 420 PERFORATOR & 1424 DRIVE ASSEMBLY

SHEET 1 OF 3 SHEETS

100-1-10-019 | REV. C

25X1

25X1

25X1

SECRET

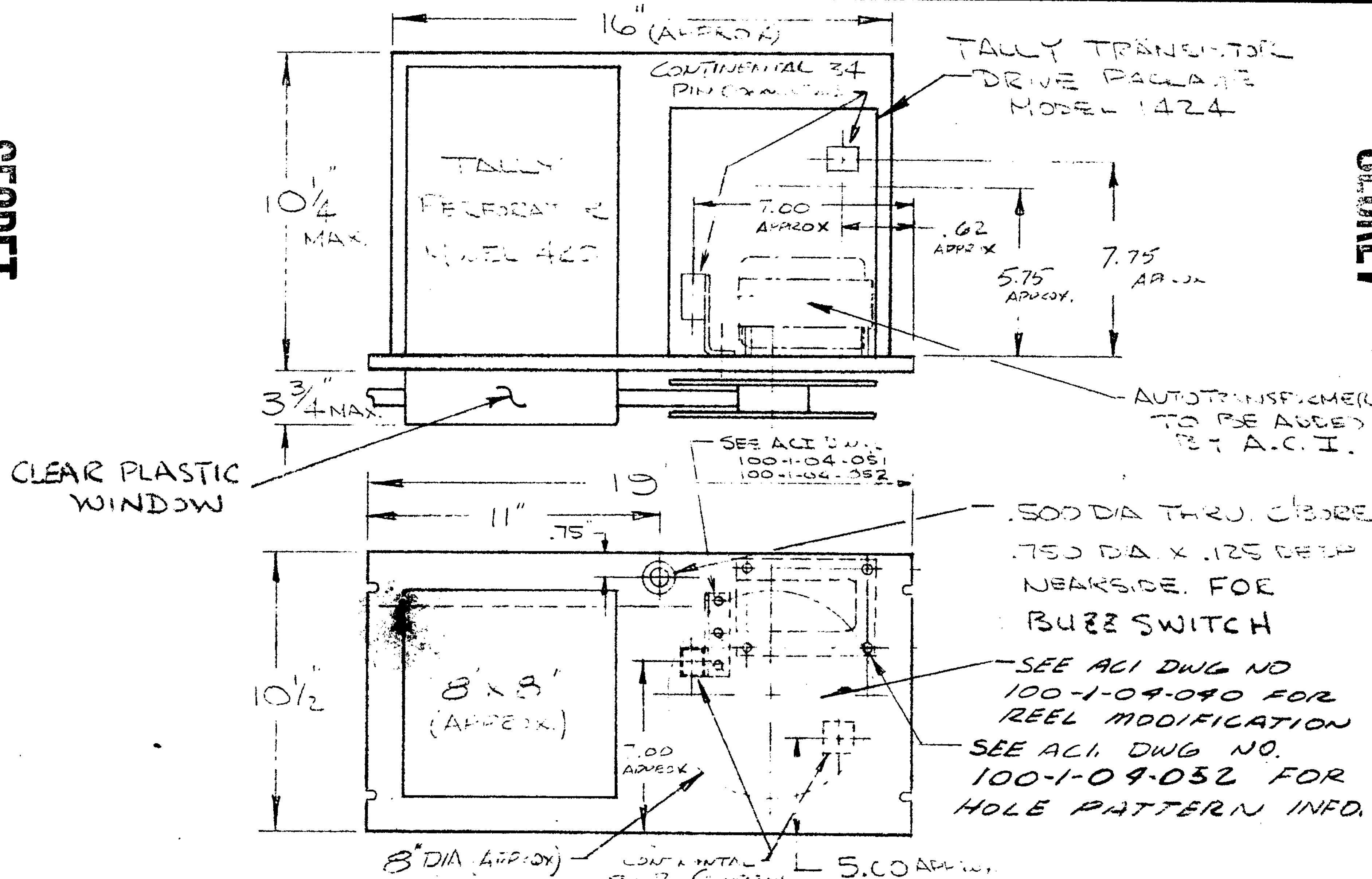
NOT RELEASABLE TO FOREIGN NATIONALS

100-1-10-019

Prepared	BG	Date 10/12/61
Approved		
Approved		

100-1-10-019 | C
SHEET 2 OF 3 SHEETS | REV.

TITLE
TALLY 420 PERFORATOR & REEL DRIVE ASSEMBLY



Declassified in Part - Sanitized Copy Approved for Release 2012/10/16 : CIA-RDP78-03433A001100040001-6

NOTES FOR PERFORATOR

1. Input power requirements 90-126 VAC 45 to 60 cycles
2. Duty Cycle one hour on five hours off.
3. Tape speed 0 - 30 character/second and to meet Note 1.
4. One direction tape motion only required (as shown)
5. Provide damping for acoustic noise
6. Unit to include cooling fan if required
7. Hinged cover over punch head and chad box and cover to include slot for tape path.
8. Weight minimum consistent with good design practice.
9. Operating characteristics not noted to be similar to Tally 420 perforator.
10. Temperature range 0° to 65° C.

25X1

SHEET 3 OF 3 SHEETS — 100-1-10-019 — REV. A

TITLE: Tally 420 Perforator and 1424 Drive Assembly

Prepared: B.G. — Date 10/12/61
Approved:
Approved:

25X1

SECRET

100-1-10-006 | C
SHEET 1 OF 4 SHEETS | REV.
TITLE POWER SUPPLY

REVISION A.
1.1.1, ADDED XFORMER TAP INFO.
1.2.1, 550 ma WAS 225 ma, 2 PLACES
3.1, ADDED OUTLINE DWG. NOTE
3.4.1 OPTIONAL NOTE ADDED
3.5 & 4.0 ADDED
ADDED 2 SHTS. & RENUMBERED ALL SHTS.

REVISION B
SHEET 4. 8-32NC-2 THD WAS 10-32NC-2THD

REVISION C.
SHEET 2 - ADDED "& TEMPERATURE" TO 1.2.3
SHEET 4 - 6.500 WAS 6.750 & .500 & .547 WAS .375

25X1

Sheet	Rev.	
4	C	OUTLINE DRAWING
3	A	SPECIFICATION
2	C	SPECIFICATION
1	C	INDEX & REVISIONS

Sheet Index

Prepared	Approved	Approved
Date		

25X1

SECRET

100-1-10-006

NOT RELEASABLE TO FOREIGN NATIONALS

100-1-10-006 C REV.

SHEET 2 OF 4 SHEETS

TITLE Power Supply, Transmitter Unit

1.0 Electrical Characteristics

1.1 Input

1.1.1 Input Voltage: The input voltage is nominally 115V RMS with a tolerance of -25% + 10%. A transformer tap shall be provided to permit operation of the supply from a 220V RMS line.

1.1.2 Input Frequency: The input frequency is nominally 60 cycles per second with a tolerance of -25% + 10%.

1.1.3 Input Fusing: The power supply shall be protected by a fuse in the primary line.

1.2 Output

1.2.1 Nominal Output Voltages and Currents:
The power supply shall deliver the following DC output voltages and currents:
+ 12 volts at 550 milliamperes
- 12 volts at 550 milliamperes
- 24 volts at 450 milliamperes at minimum line voltage

1.2.2 Control of Output Voltage:
The output voltages of the -12 volts and +12 volt lines shall be adjustable 5% above and below the nominal voltage. No adjustment is required for the -24 volt supply.

1.2.3 Regulation: Voltage regulation of the +12 and - 12 volt supply for load, line & temp. changes shall be ± 1%. The load current variation shall be assumed to be from 50 milliamperes to 225 milliamperes for each of the 12 volt supplies. The line variation is as defined in paragraph 1.1.

No regulation for primary line voltage changes is required for the -24 volt supply. Load regulation shall be ± 10% of the nominal -24 volts for current changes between 0 and 450 milliamperes.

1.2.4 Ripple: The ripple content shall be less than 1 millivolt rms for any of the 12 volt supplies over a load current range as set forth in paragraph 1.2.3. The ripple voltage on the -24 volt supply shall be less than 500 millivolts rms for current drains between 0 and 450 milliamperes.

Date 11-26-61

Prepared

Approved

Approved

25X1

25X1

25X1

1.2.5 Output Impedance: The output impedance of the +12V and -12V lines at 100 kc shall be less than 0.1 ohms.

1.3 Efficiency of Power Conversion

1.3.1 No particularly stringent requirements exist with respect to the efficiency of the power supply. Operational reliability and good performance are the significant parameters.

2.0 Environmental Requirements

2.1 Temperature: The power supply shall operate within the specifications of paragraph 1 over an ambient temperature range between °C and - °C. The supply shall be operable without damage to - °C.

2.2 Humidity: Relative humidities between 1 % and 1 % shall not adversely affect the operation of the power supply.

2.3 Vibration: The power supply shall withstand without damage, vibration as encountered in shipment on commercial carrier.

3.0 Mechanical Requirements and Considerations

3.1 Dimensions: The maximum available volume for the power supply is 3" x 7.5" x .5". One of the .5" x 7.5" surfaces shall serve as the mounting base. Package to be per outline ... s ... spec.

3.2 Terminals

3.2.1 Electrical connections shall be accomplished on one of the .5" x . " sides. A ... with solder terminals shall be provided for this purpose. The terminals may extend a maximum of .5 inches beyond the specified overall dimensions.

3.2.2 The ... shall be accessible from the outside of the power supply. It shall be located adjacent to the ... and may extend a maximum of ... inches beyond the 7.5" x . " dimension.

3.3 Weight: The maximum weight shall be ... lbs.

3.4 Marking

3.4.1 Each item shall be marked with Advanced Communications, Inc. Specification Number AC ... and optional to include supplier's name and type number.

3.5 Workmanship to ... equal to or exceed good commercial practice. All parts to have protective finish with exterior case to be dull black.

4.0 Approved Suppliers

100-1-10-006 A
REV.
SHEET 3 OF 4 SHEETS
TITLE
Power Supply, Transmitter Unit

Date
Prepared
Approved
Approved

25X1

25X1

~~SECRET~~ CONFIDENTIAL

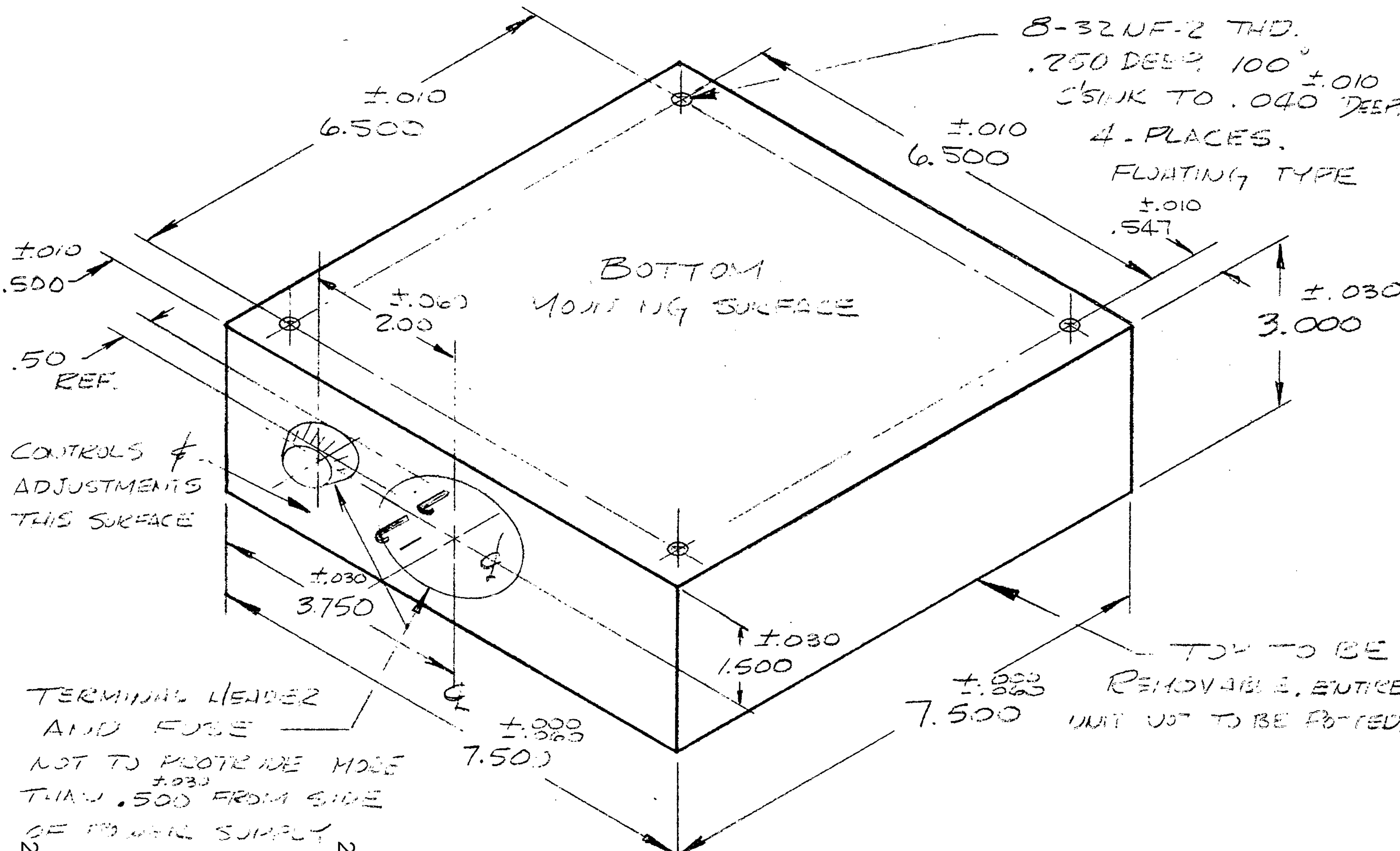
NOT RELEASABLE TO FOREIGN NATIONALS

Prepared	[redacted]	Date 11-22-61	
Approved			
Approved			

100-1-10-006 | C

SHEET 4 OF 4 SHEETS | REV.

TITLE POWER SUPPLY, OUTLINE DRAWING



25X1

25X1

25X1

~~SECRET~~ CONFIDENTIAL

NOT RELEASABLE TO FOREIGN NATIONALS

100-1-10-006